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Miyahara

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(54) **IMAGE PROCESSING APPARATUS, INFORMATION PROCESSING APPARATUS, AND CONTROL METHOD**

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(51) **Int. Cl.**

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H04N 1/00	(2006.01)
G06K 15/00	(2006.01)
B65H 39/10	(2006.01)
H04N 1/32	(2006.01)
G03G 15/00	(2006.01)

(52) **U.S. Cl.**

CPC ***B65H 37/04*** (2013.01); ***G03G 15/6541*** (2013.01); ***H04N 1/0032*** (2013.01); ***H04N 1/32144*** (2013.01); *B65H 2301/1635* (2013.01); *B65H 2301/43828* (2013.01); *B65H 2301/5111* (2013.01); *B65H 2408/1222* (2013.01); *B65H 2511/512* (2013.01); *B65H 2801/27* (2013.01); *G03G 15/6544* (2013.01); *G03G 2215/00848* (2013.01); *G06K 15/404* (2013.01); *H04N 2201/0094* (2013.01); *H04N 2201/3253* (2013.01)

(58) **Field of Classification Search**

CPC B65H 37/04; B65H 2301/1635; B65H 2301/43828; B65H 2301/5111; B65H 2408/1222; B65H 2511/512; B65H 2801/27; G03G 15/6541; G03G 15/6544; G03G 2215/00848; H04N 1/0032; H04N 1/32144; H04N 2201/0094; H04N 2201/3253; G06K 15/404

USPC 358/3.28; 399/408; 270/1.01, 58.08

See application file for complete search history.

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* cited by examiner

Primary Examiner — Quang N Vo

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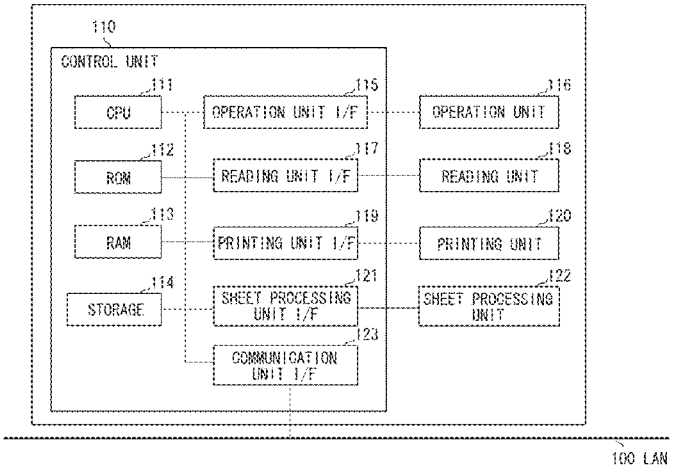
(57) **ABSTRACT**

An image processing apparatus performs a binding process for binding a plurality of sheets. When a binding unit configured to bind sheets without using a staple performs the binding process, the image processing apparatus adds a mark for identifying a position where the binding process is performed.

13 Claims, 25 Drawing Sheets



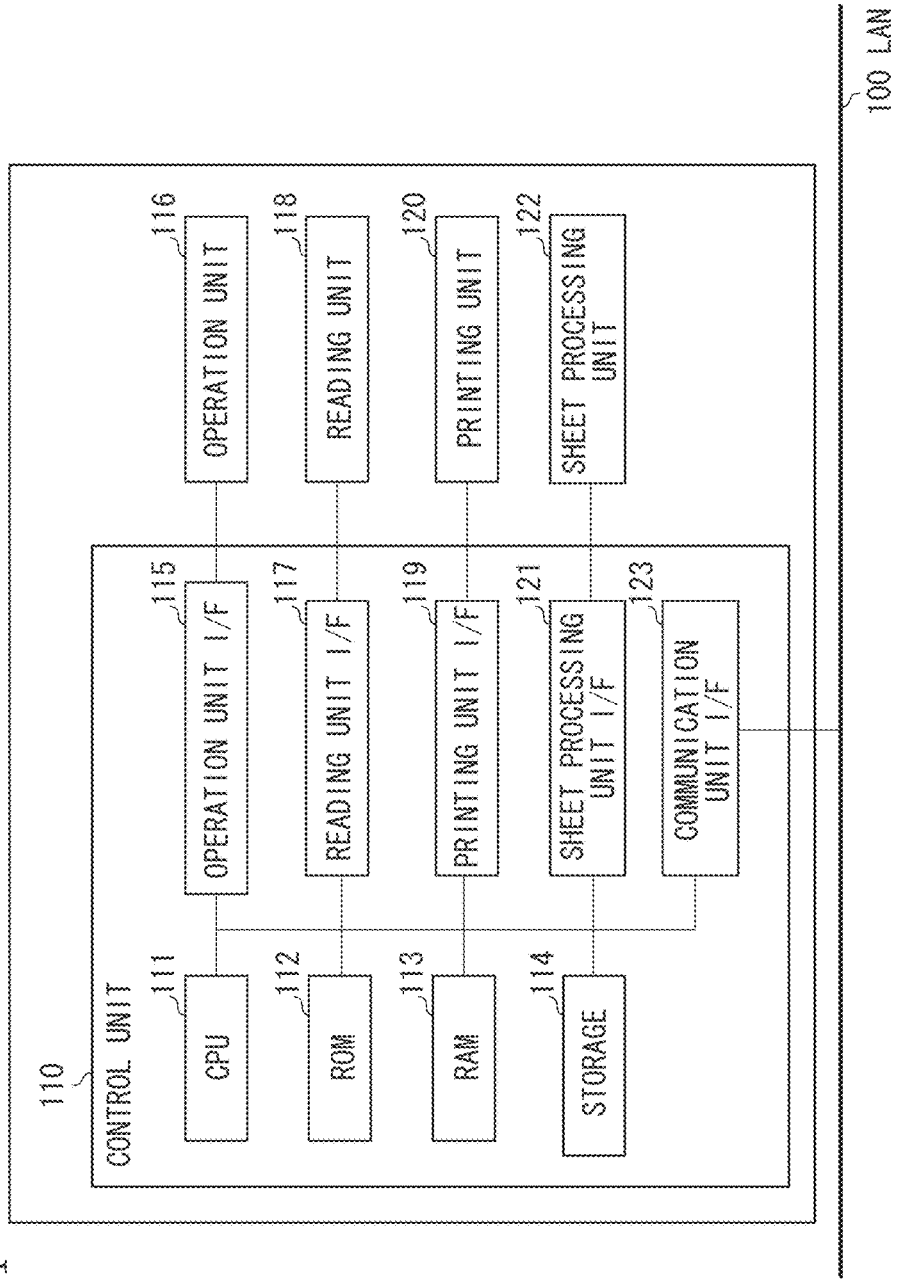

100 LAN
110
CONTROL UNIT
111
CPU
112
ROM
113
RAM
114
STORAGE
115
OPERATION UNIT I/F
116
OPERATION UNIT
117
READING UNIT I/F
118
READING UNIT
119
PRINTING UNIT I/F
120
PRINTING UNIT
121
SHEET PROCESSING UNIT I/F
122
SHEET PROCESSING UNIT
123
COMMUNICATION UNIT I/F

FIG. 1

FIG. 2

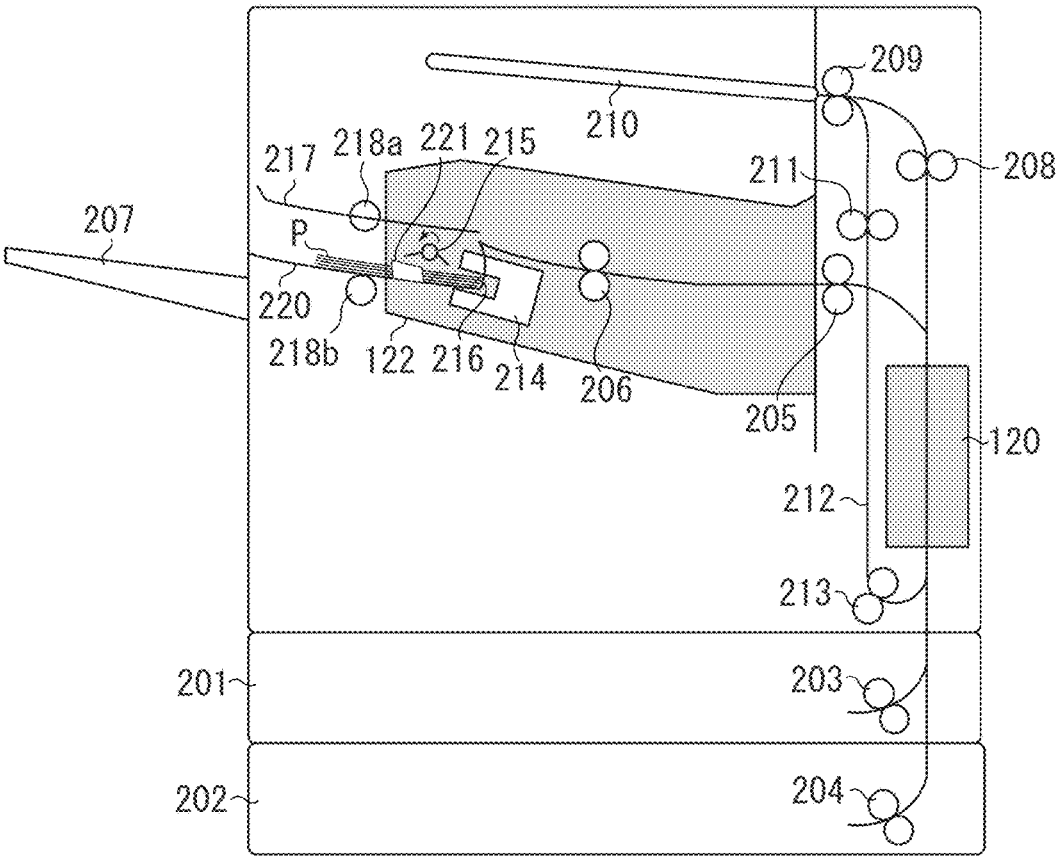

209
210
208
217
218a
221
215
211
207
P
220
218b
122
216
214
206
205
120
212
213
201
203
202
204

FIG. 3

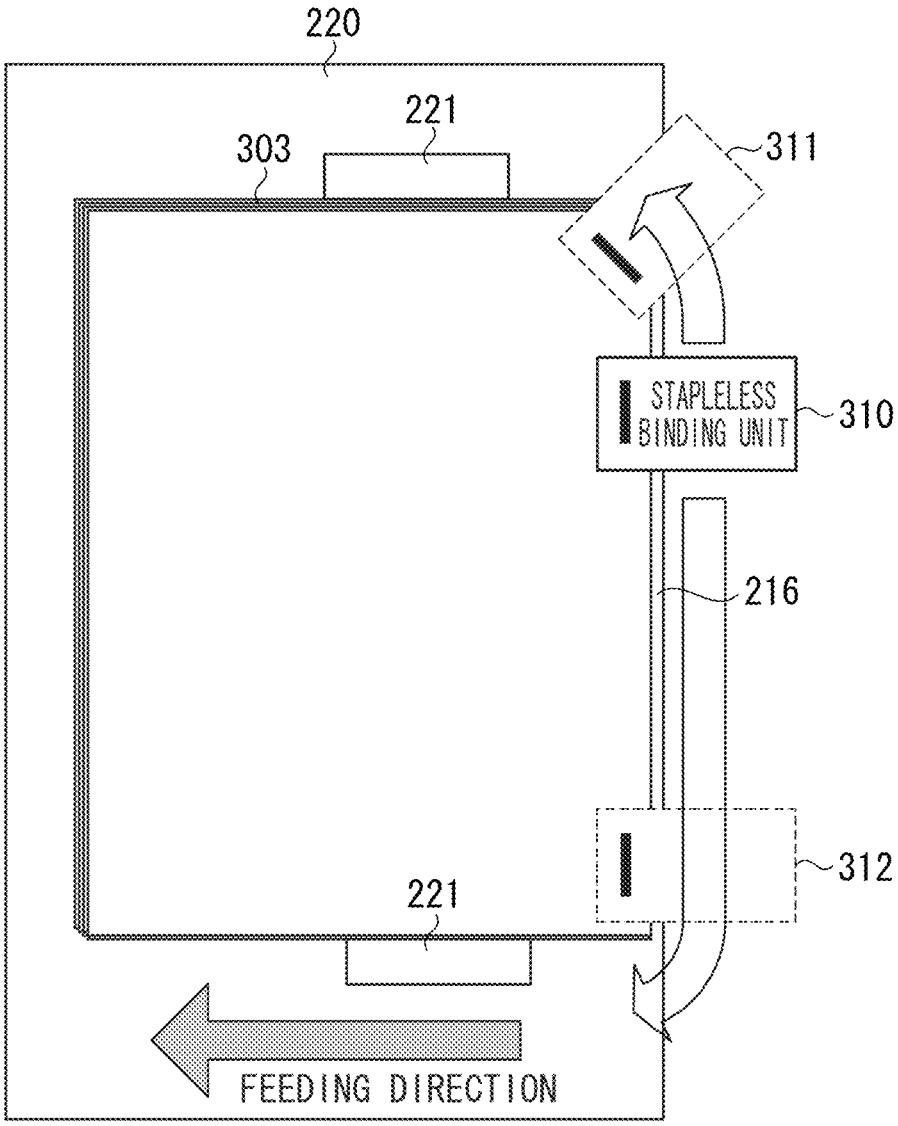

220
221
303
311
STAPLELESS BINDING UNIT
310
216
312
221
FEEDING DIRECTION

FIG. 4A

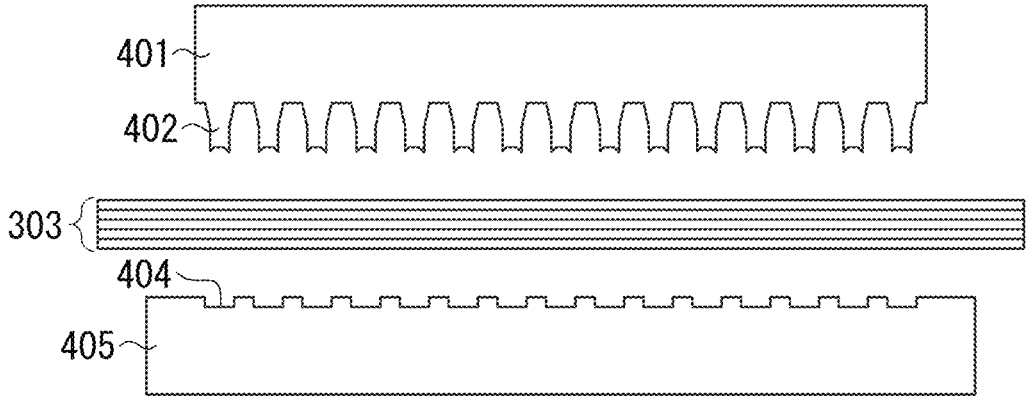


FIG. 4B

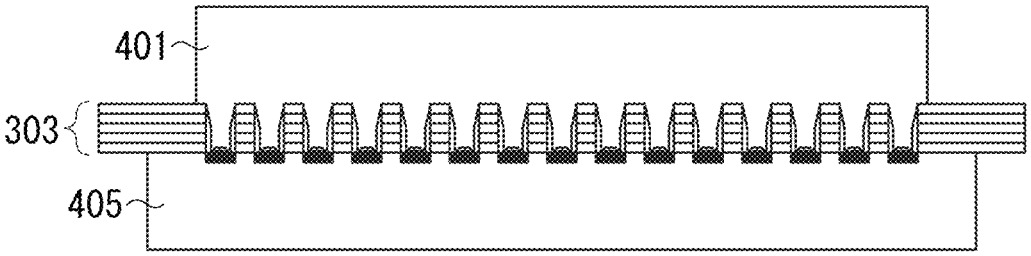


FIG. 5

FIG. 6

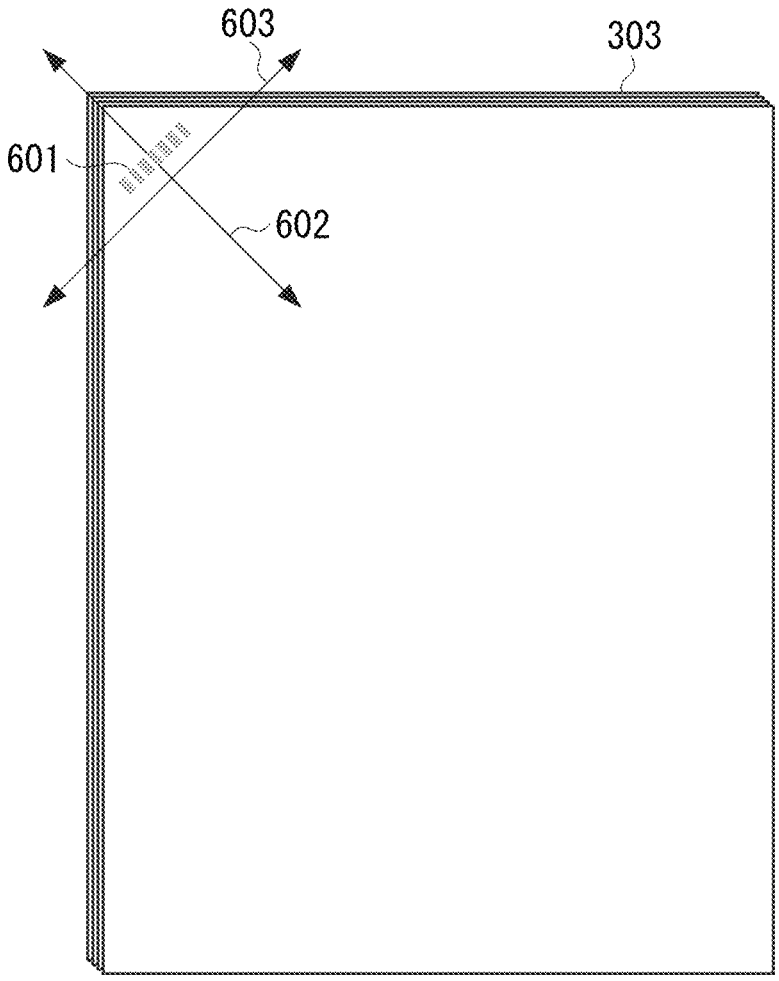


FIG. 7A

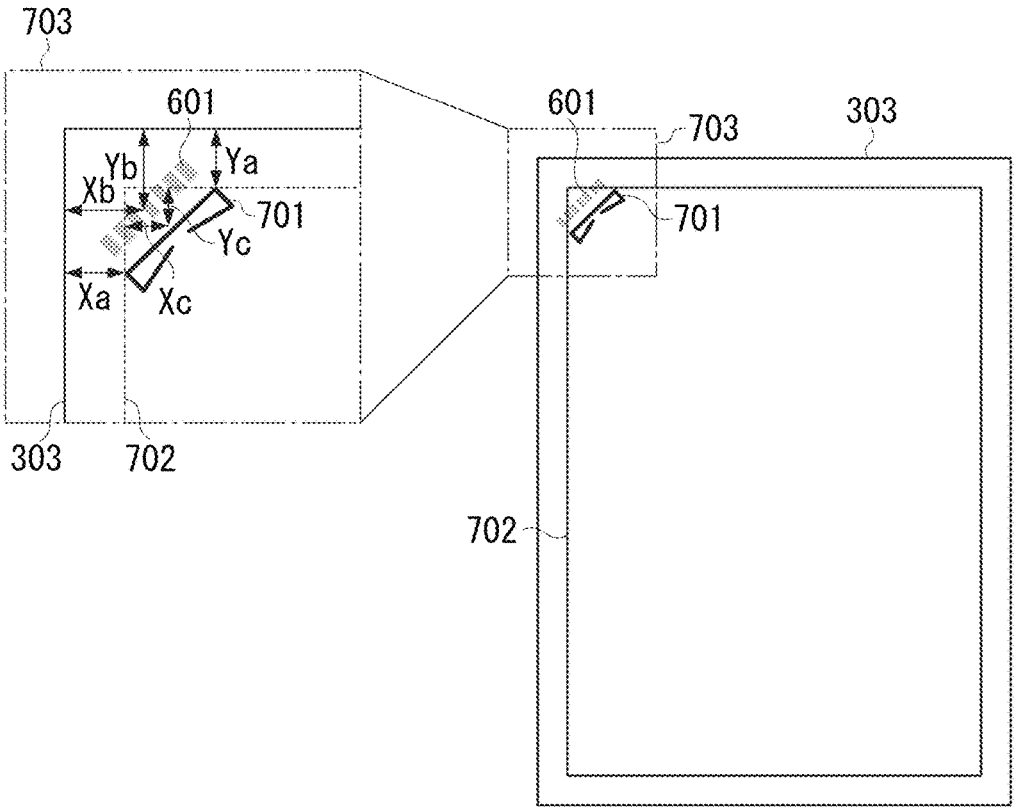
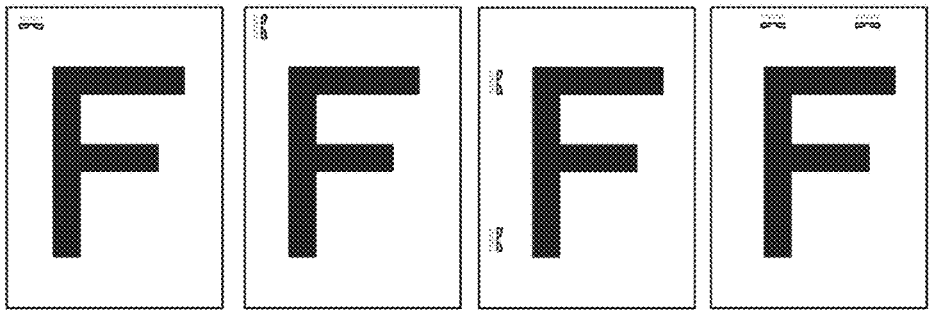


FIG. 7B



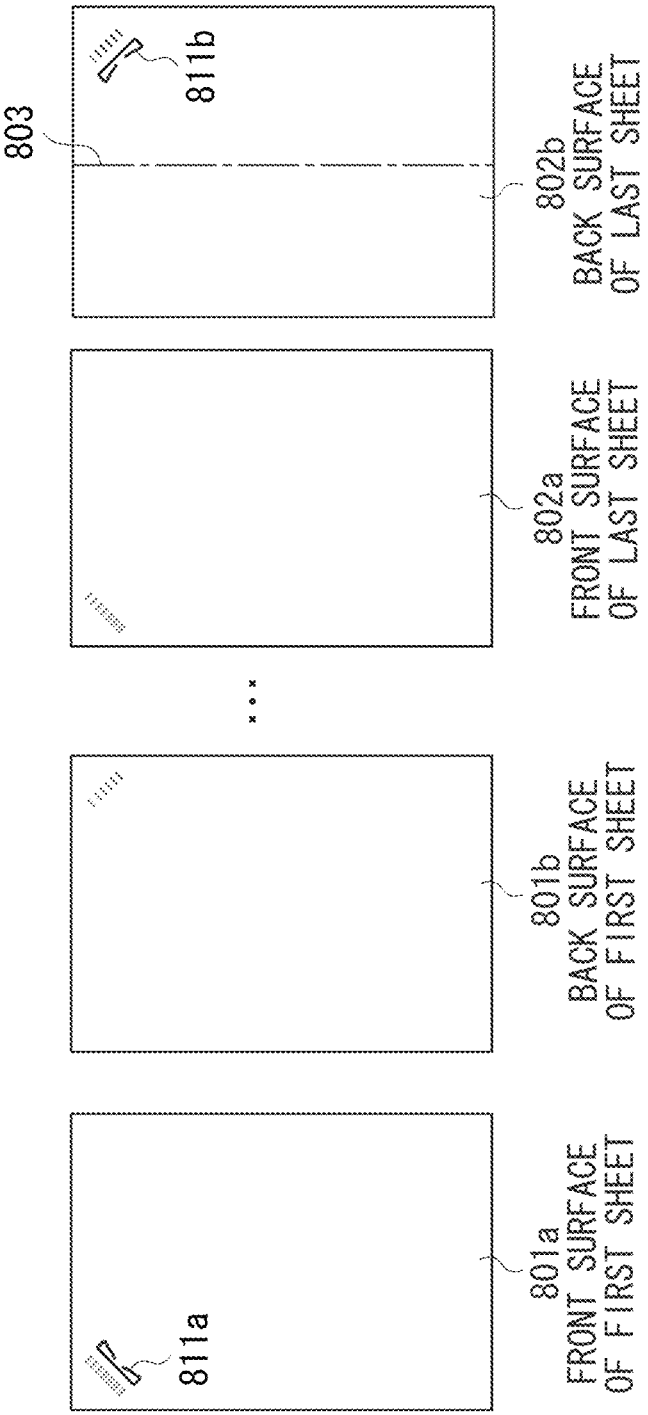

803
811b
802b
BACK SURFACE
OF LAST SHEET
802a
FRONT SURFACE
OF LAST SHEET
801b
BACK SURFACE
OF FIRST SHEET
811a
801a
FRONT SURFACE
OF FIRST SHEET

FIG. 8A

FIG. 8B

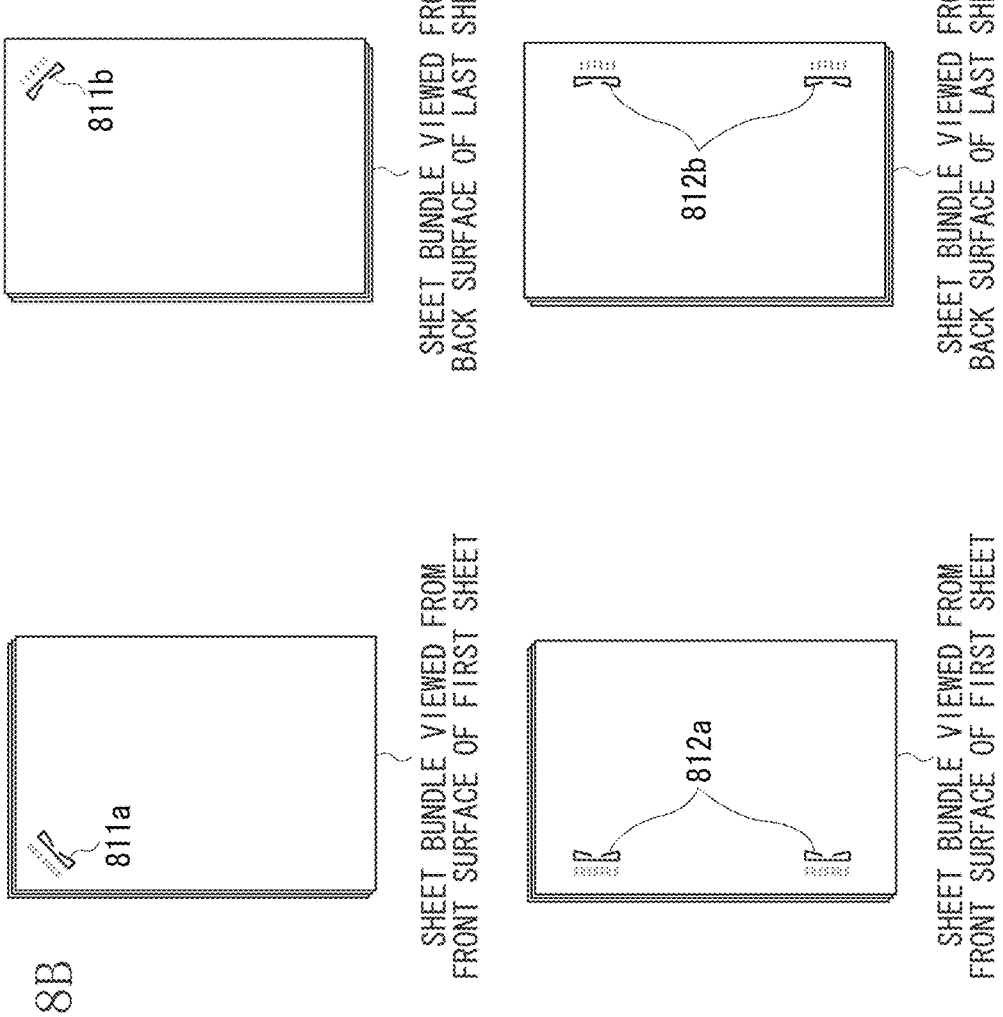

811a
SHEET BUNDLE VIEWED FROM FRONT SURFACE OF FIRST SHEET
811b
SHEET BUNDLE VIEWED FROM BACK SURFACE OF LAST SHEET
812a
SHEET BUNDLE VIEWED FROM FRONT SURFACE OF FIRST SHEET
812b
SHEET BUNDLE VIEWED FROM BACK SURFACE OF LAST SHEET

FIG. 9

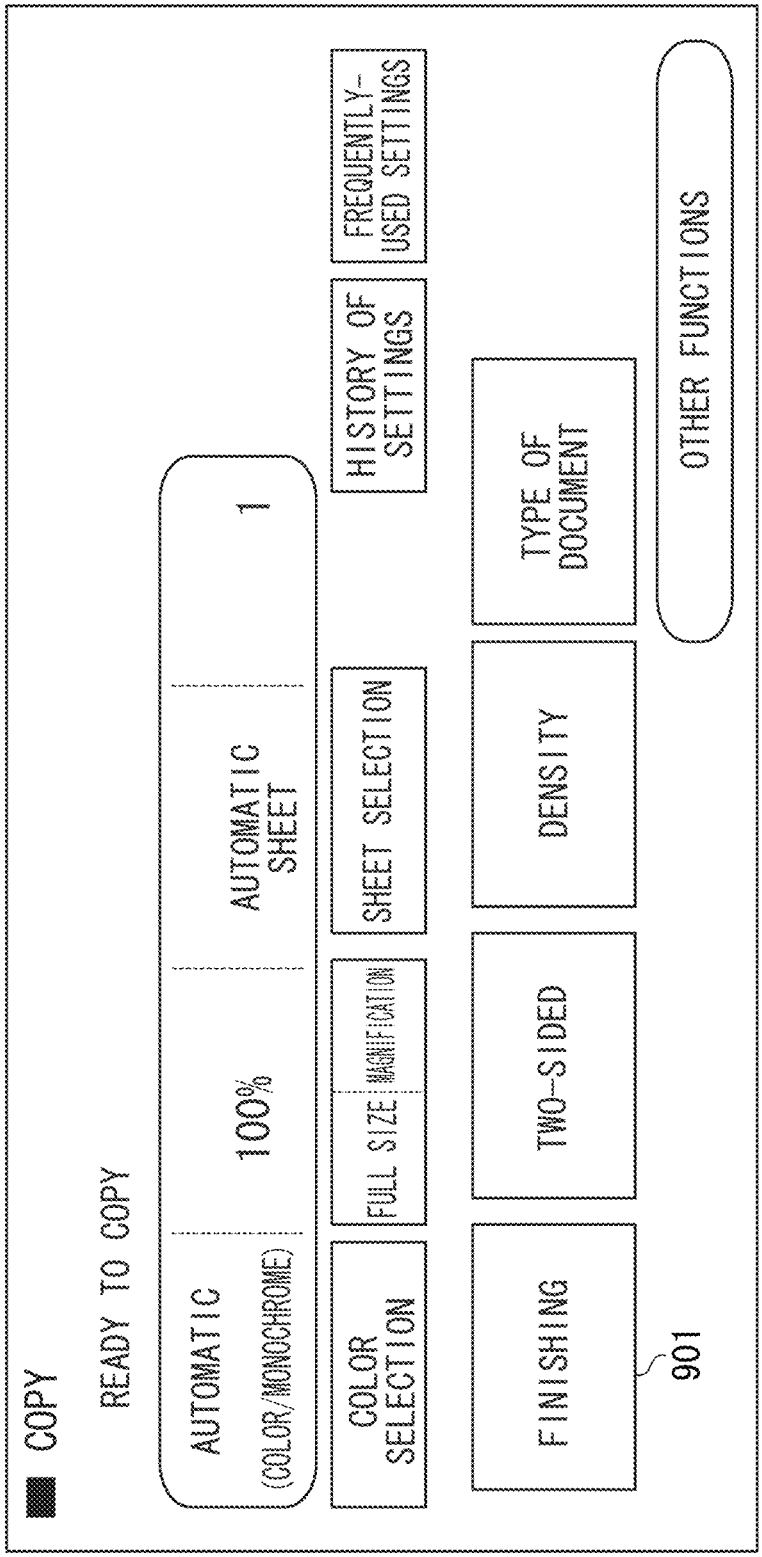

COPY
READY TO COPY
AUTOMATIC (COLOR/MONOCHROME)
100%
AUTOMATIC SHEET
1
COLOR SELECTION
FULL SIZE
MAGNIFICATION
SHEET SELECTION
HISTORY OF SETTINGS
FREQUENTLY-USED SETTINGS
FINISHING
TWO-SIDED
DENSITY
TYPE OF DOCUMENT
OTHER FUNCTIONS
901

FIG. 10A

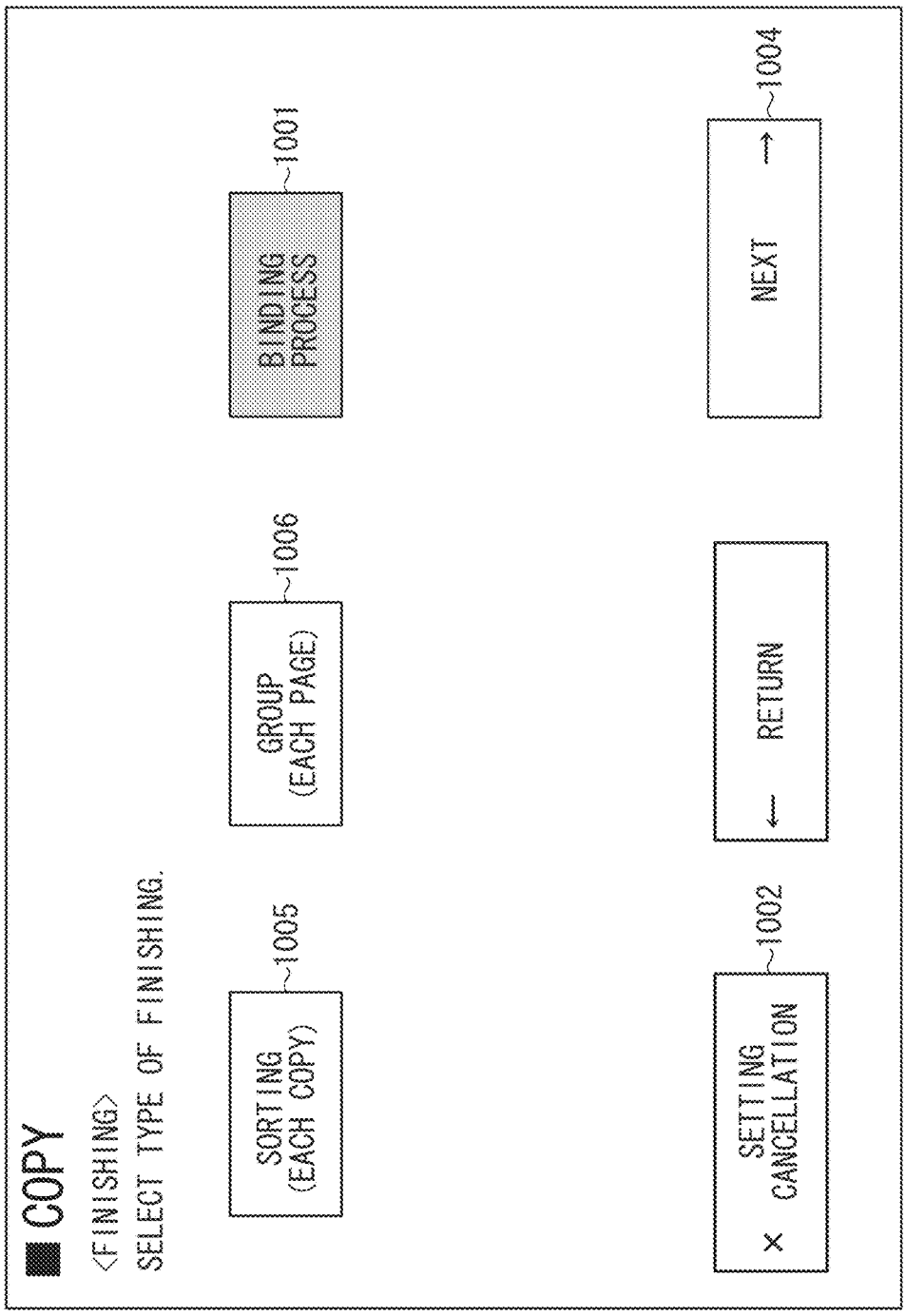

COPY
<FINISHING>
SELECT TYPE OF FINISHING.
SORTING (EACH COPY)
1005
GROUP (EACH PAGE)
1006
BINDING PROCESS
1001
SETTING CANCELLATION
1002
RETURN
NEXT
1004

FIG. 10B

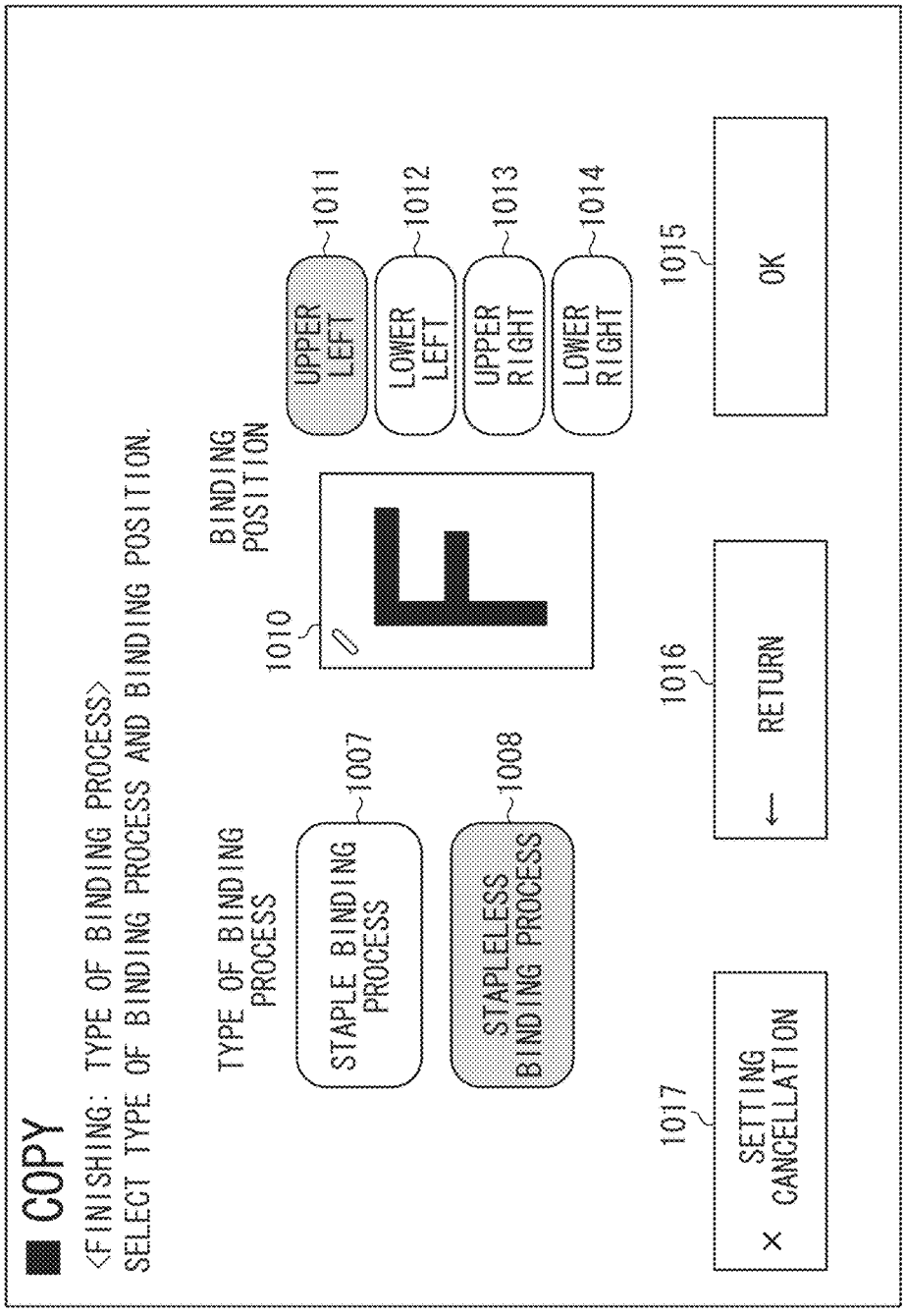

■ COPY
<FINISHING: TYPE OF BINDING PROCESS>
SELECT TYPE OF BINDING PROCESS AND BINDING POSITION.
TYPE OF BINDING PROCESS
STAPLE BINDING PROCESS
1007
STAPLELESS BINDING PROCESS
1008
BINDING POSITION
1010
UPPER LEFT
1011
LOWER LEFT
1012
UPPER RIGHT
1013
LOWER RIGHT
1014
1015
OK
1016
RETURN
1017
SETTING CANCELLATION

FIG. 11

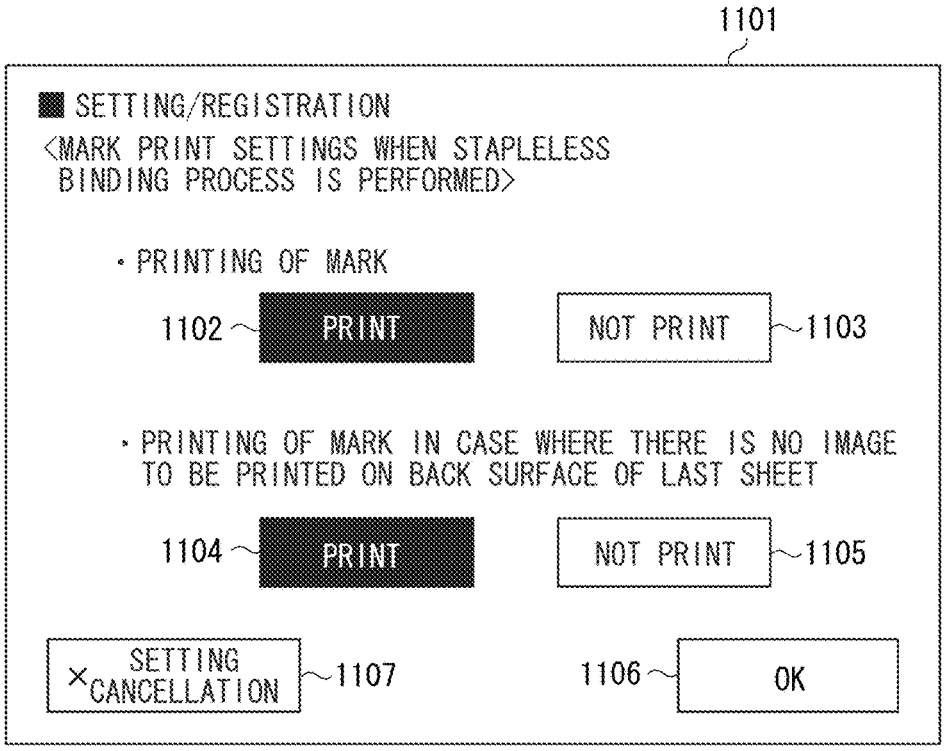

1101
■ SETTING/REGISTRATION
<MARK PRINT SETTINGS WHEN STAPLELESS BINDING PROCESS IS PERFORMED>
・PRINTING OF MARK
1102
PRINT
NOT PRINT
1103
・PRINTING OF MARK IN CASE WHERE THERE IS NO IMAGE TO BE PRINTED ON BACK SURFACE OF LAST SHEET
1104
PRINT
NOT PRINT
1105
×SETTING CANCELLATION
1107
1106
OK

FIG. 12

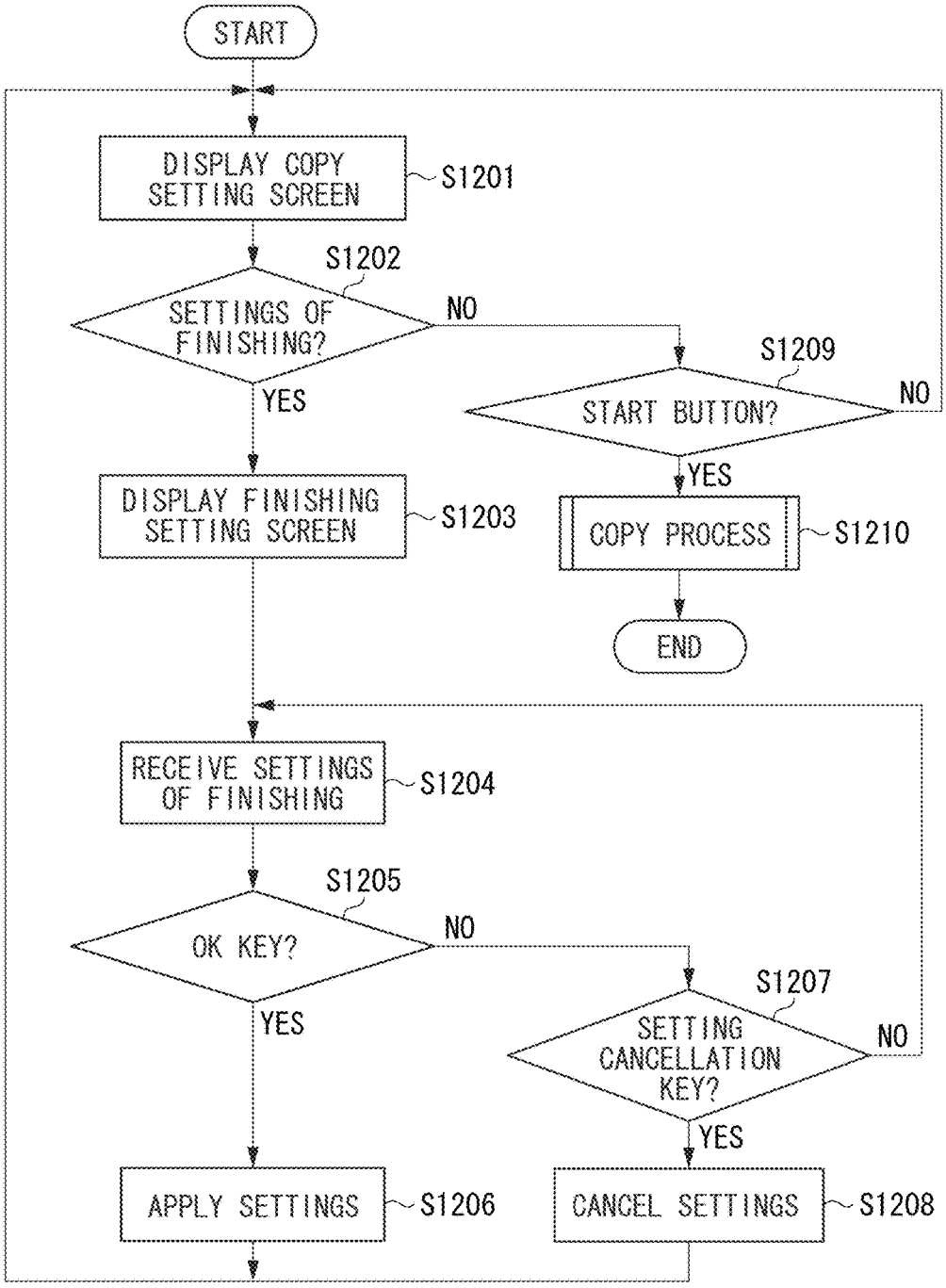

START
DISPLAY COPY SETTING SCREEN
S1201
S1202
SETTINGS OF FINISHING?
NO
YES
S1209
START BUTTON?
NO
YES
DISPLAY FINISHING SETTING SCREEN
S1203
COPY PROCESS
S1210
END
RECEIVE SETTINGS OF FINISHING
S1204
S1205
OK KEY?
NO
YES
S1207
SETTING CANCELLATION KEY?
NO
YES
APPLY SETTINGS
S1206
CANCEL SETTINGS
S1208

FIG. 13

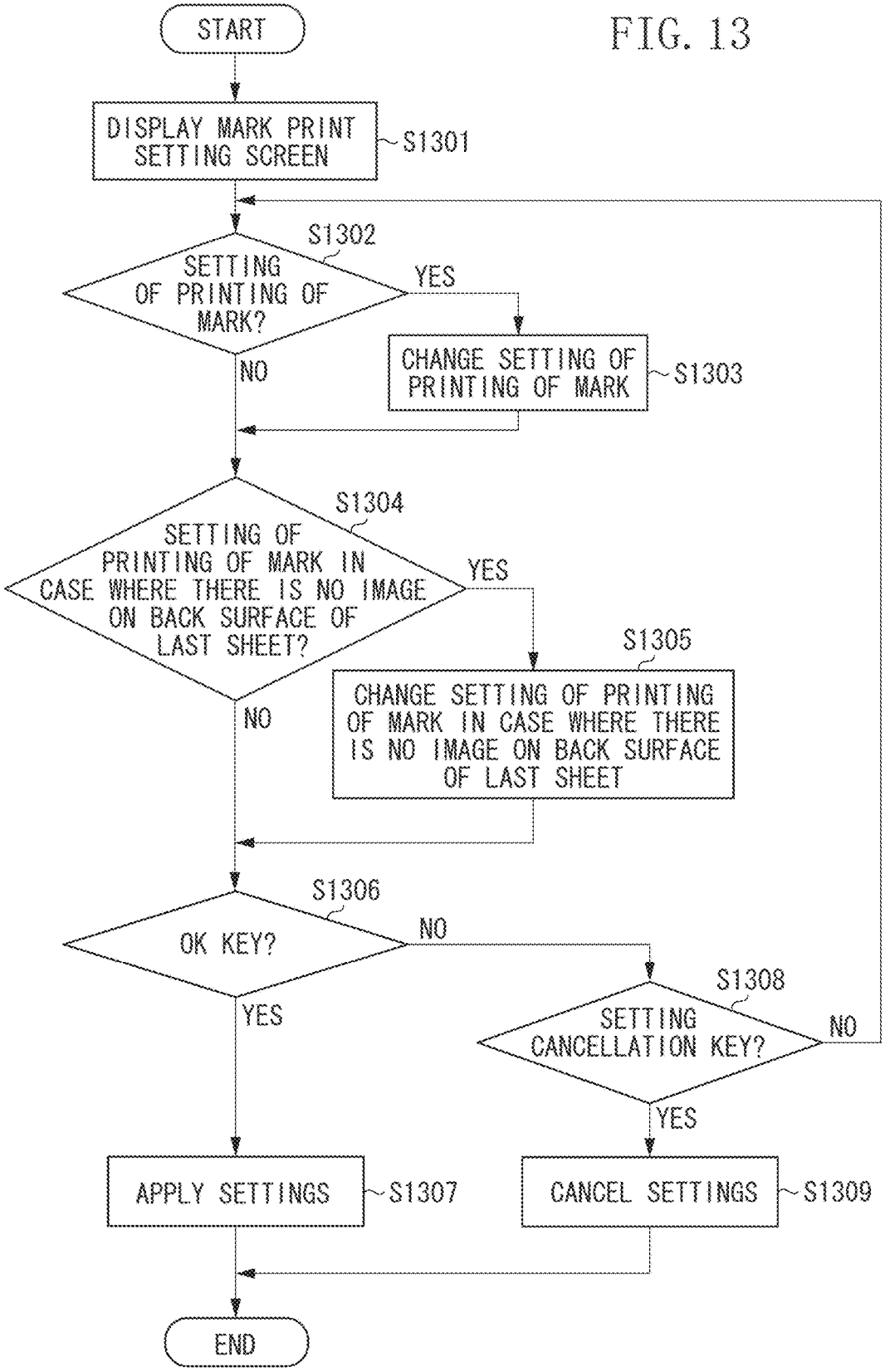

START
DISPLAY MARK PRINT SETTING SCREEN
S1301
S1302
SETTING OF PRINTING OF MARK?
YES
NO
CHANGE SETTING OF PRINTING OF MARK
S1303
S1304
SETTING OF PRINTING OF MARK IN CASE WHERE THERE IS NO IMAGE ON BACK SURFACE OF LAST SHEET?
YES
NO
S1305
CHANGE SETTING OF PRINTING OF MARK IN CASE WHERE THERE IS NO IMAGE ON BACK SURFACE OF LAST SHEET
S1306
OK KEY?
NO
YES
S1308
SETTING CANCELLATION KEY?
NO
YES
APPLY SETTINGS
S1307
CANCEL SETTINGS
S1309
END

FIG. 14A

FIG. 14

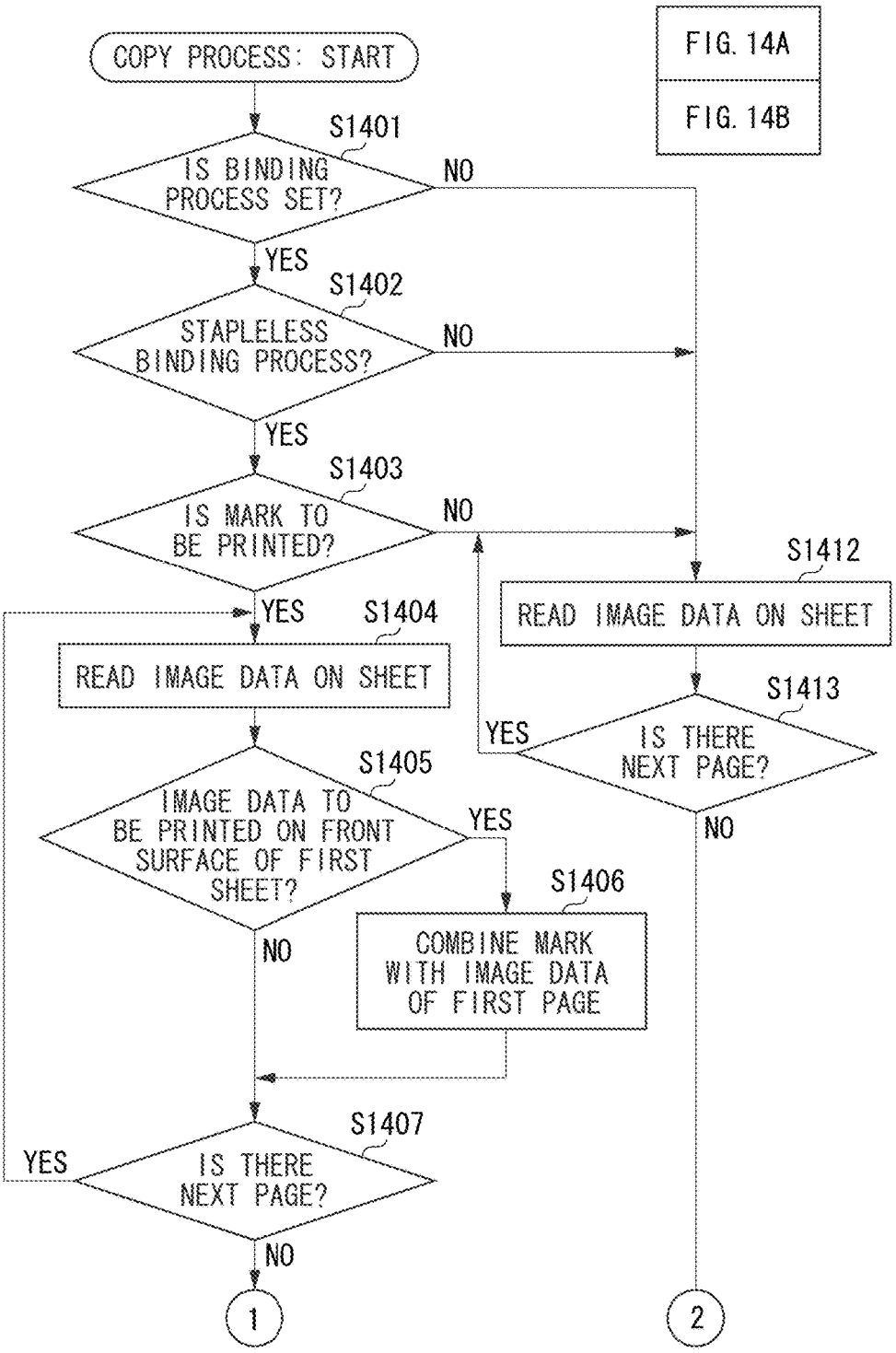


FIG. 14B

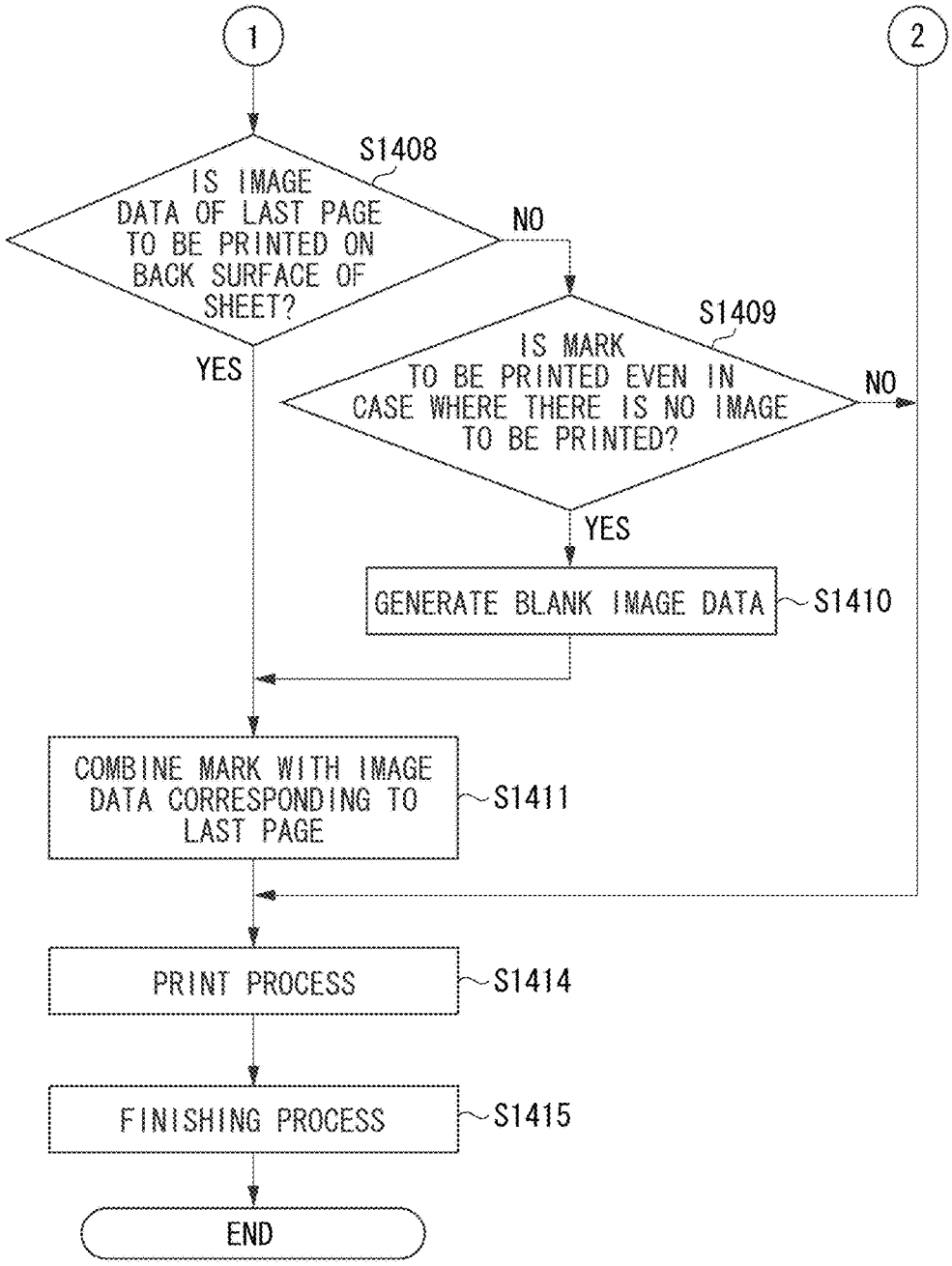

1
2
S1408
IS IMAGE DATA OF LAST PAGE TO BE PRINTED ON BACK SURFACE OF SHEET?
NO
YES
S1409
IS MARK TO BE PRINTED EVEN IN CASE WHERE THERE IS NO IMAGE TO BE PRINTED?
NO
YES
GENERATE BLANK IMAGE DATA
S1410
COMBINE MARK WITH IMAGE DATA CORRESPONDING TO LAST PAGE
S1411
PRINT PROCESS
S1414
FINISHING PROCESS
S1415
END

FIG. 15A

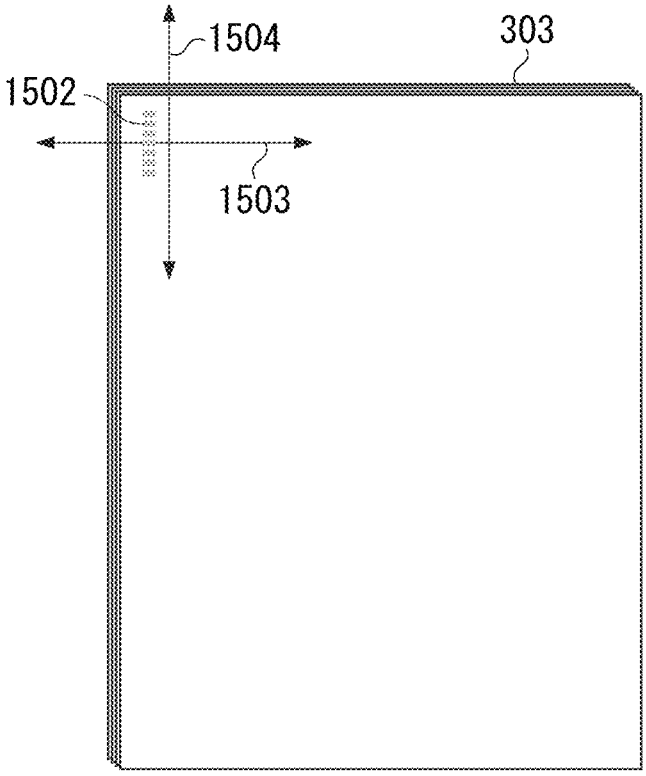
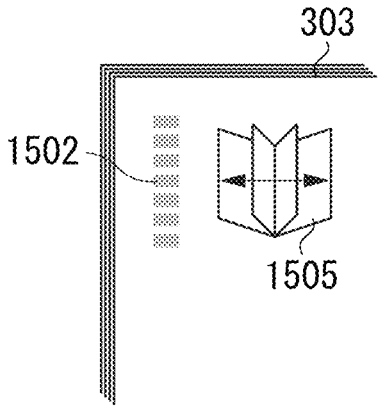


FIG. 15B



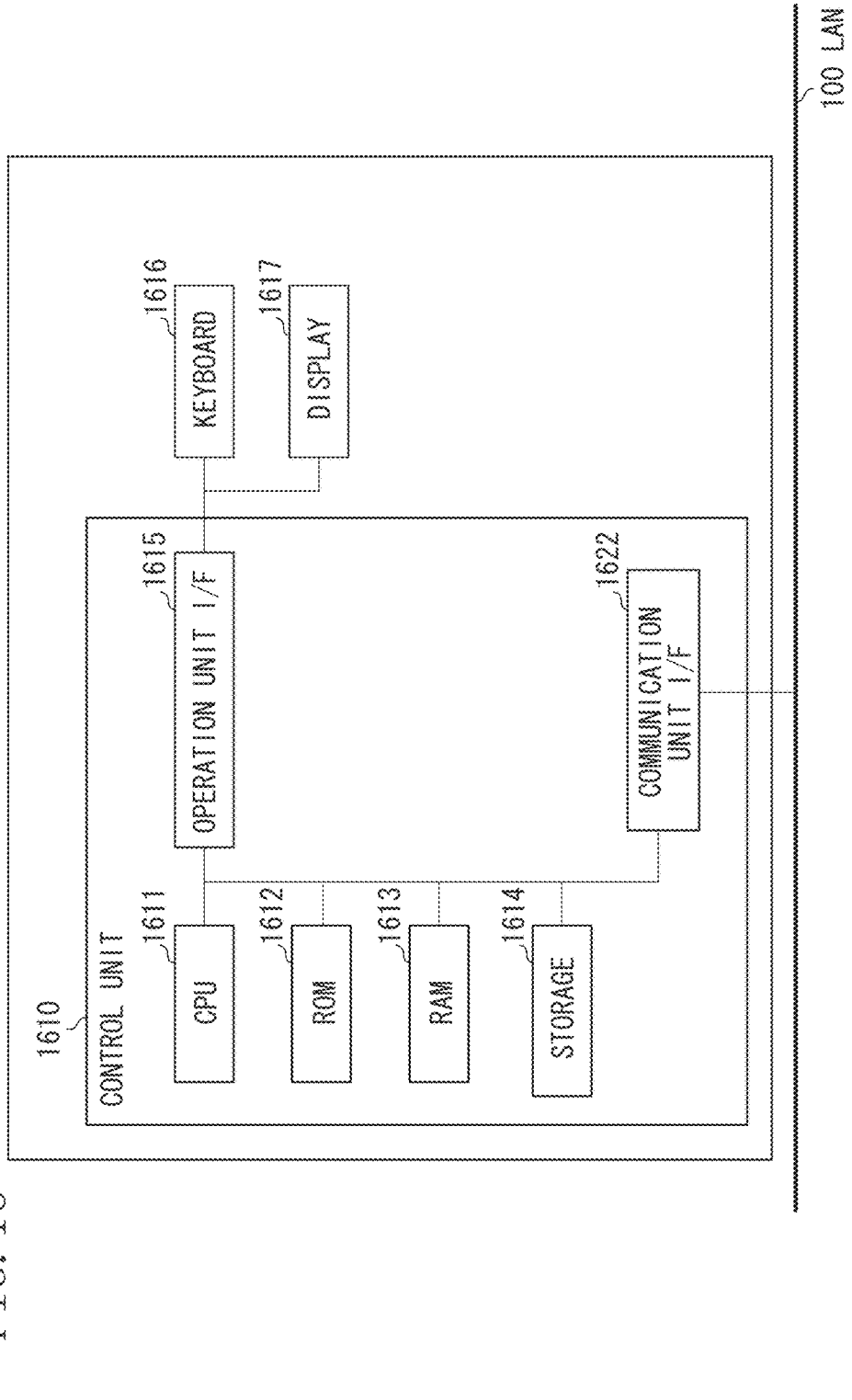
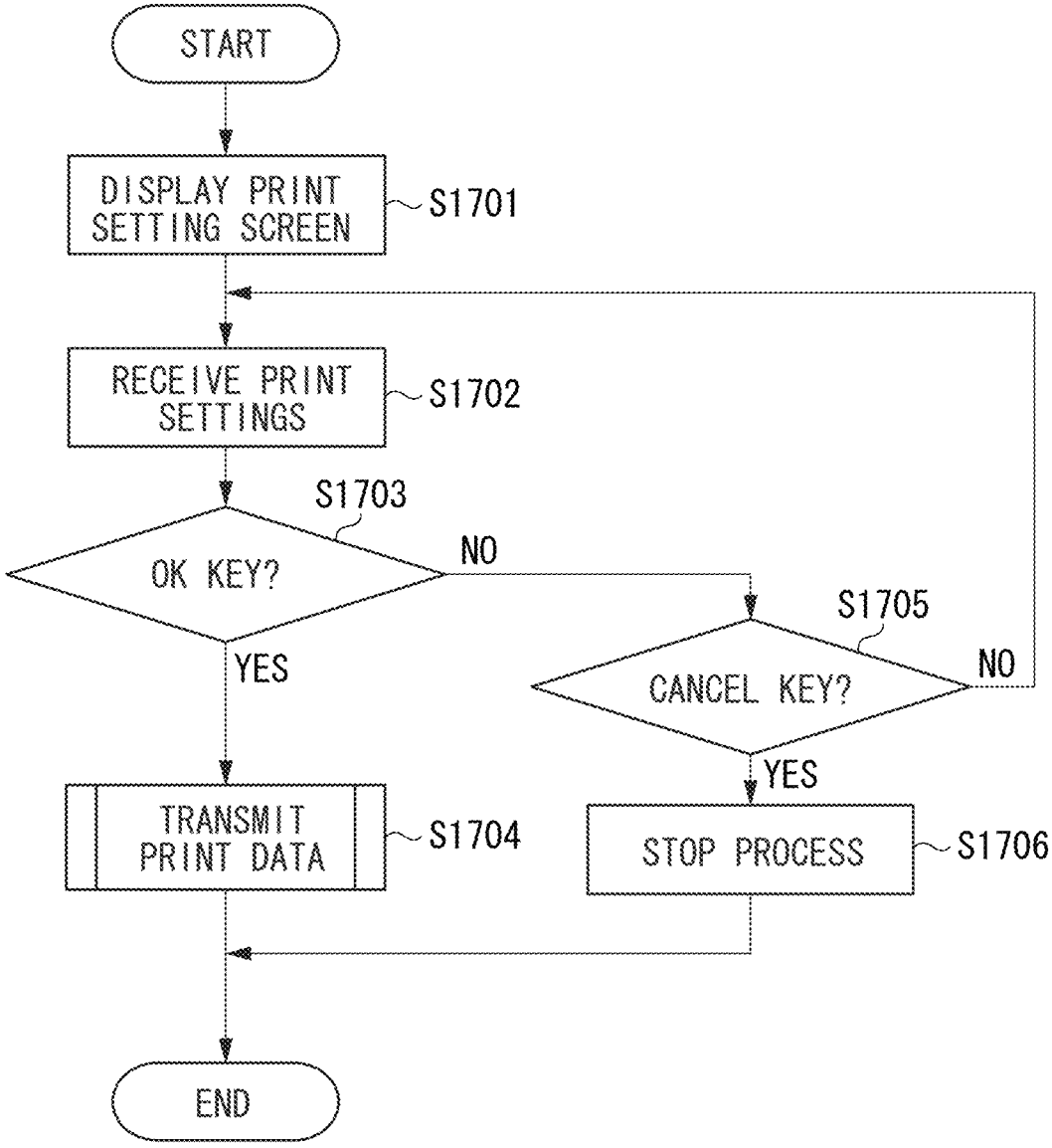

100 LAN
1610
CONTROL UNIT
1611
CPU
1612
ROM
1613
RAM
1614
STORAGE
1615
OPERATION UNIT I/F
1616
KEYBOARD
1617
DISPLAY
1622
COMMUNICATION UNIT I/F

FIG. 16

FIG. 17


START
DISPLAY PRINT SETTING SCREEN
S1701
RECEIVE PRINT SETTINGS
S1702
S1703
OK KEY?
NO
YES
S1705
CANCEL KEY?
NO
YES
TRANSMIT PRINT DATA
S1704
STOP PROCESS
S1706
END

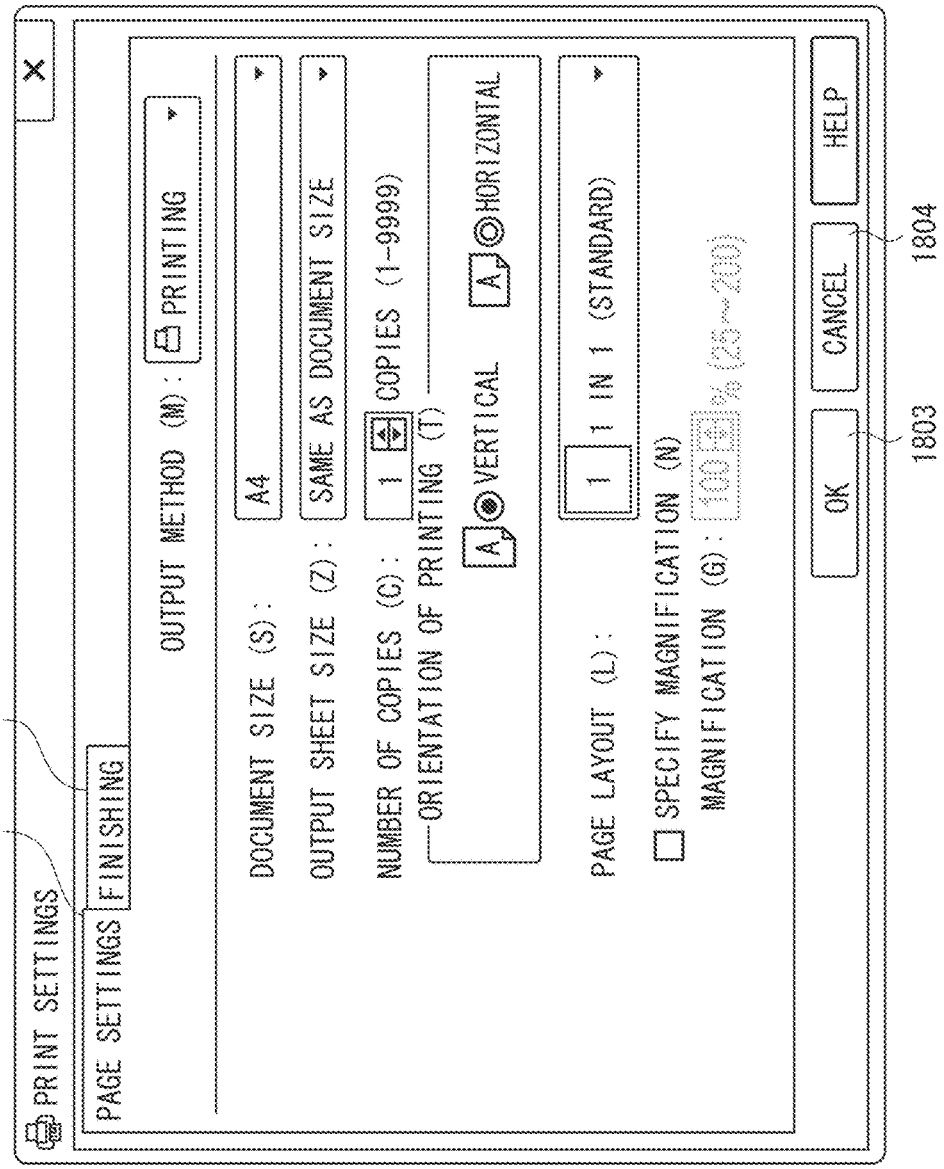

PRINT SETTINGS
PAGE SETTINGS
FINISHING
OUTPUT METHOD (M):
PRINTING
DOCUMENT SIZE (S):
A4
OUTPUT SHEET SIZE (Z):
SAME AS DOCUMENT SIZE
NUMBER OF COPIES (C):
1
COPIES (1-9999)
ORIENTATION OF PRINTING (T)
VERTICAL
HORIZONTAL
PAGE LAYOUT (L):
1 IN 1 (STANDARD)
SPECIFY MAGNIFICATION (N)
MAGNIFICATION (G):
100
% (25~400)
OK
CANCEL
HELP
1801
1802
1803
1804

FIG. 18A

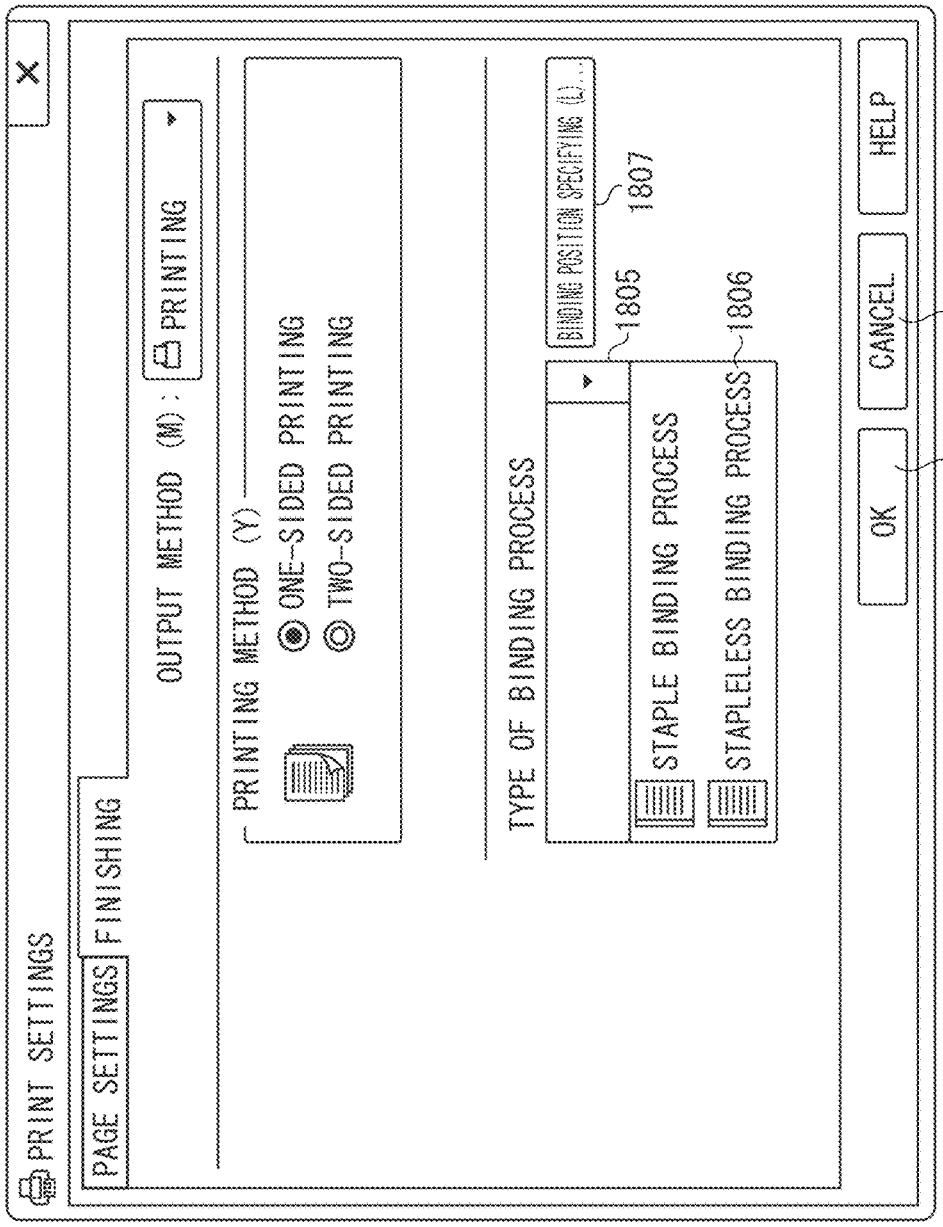

PRINT SETTINGS
PAGE SETTINGS
FINISHING
OUTPUT METHOD (M):
PRINTING
PRINTING METHOD (Y)
ONE-SIDED PRINTING
TWO-SIDED PRINTING
TYPE OF BINDING PROCESS
BINDING POSITION SPECIFYING (L)...
1807
1805
STAPLE BINDING PROCESS
1806
STAPLELESS BINDING PROCESS
OK
1803
CANCEL
1804
HELP

FIG. 18B

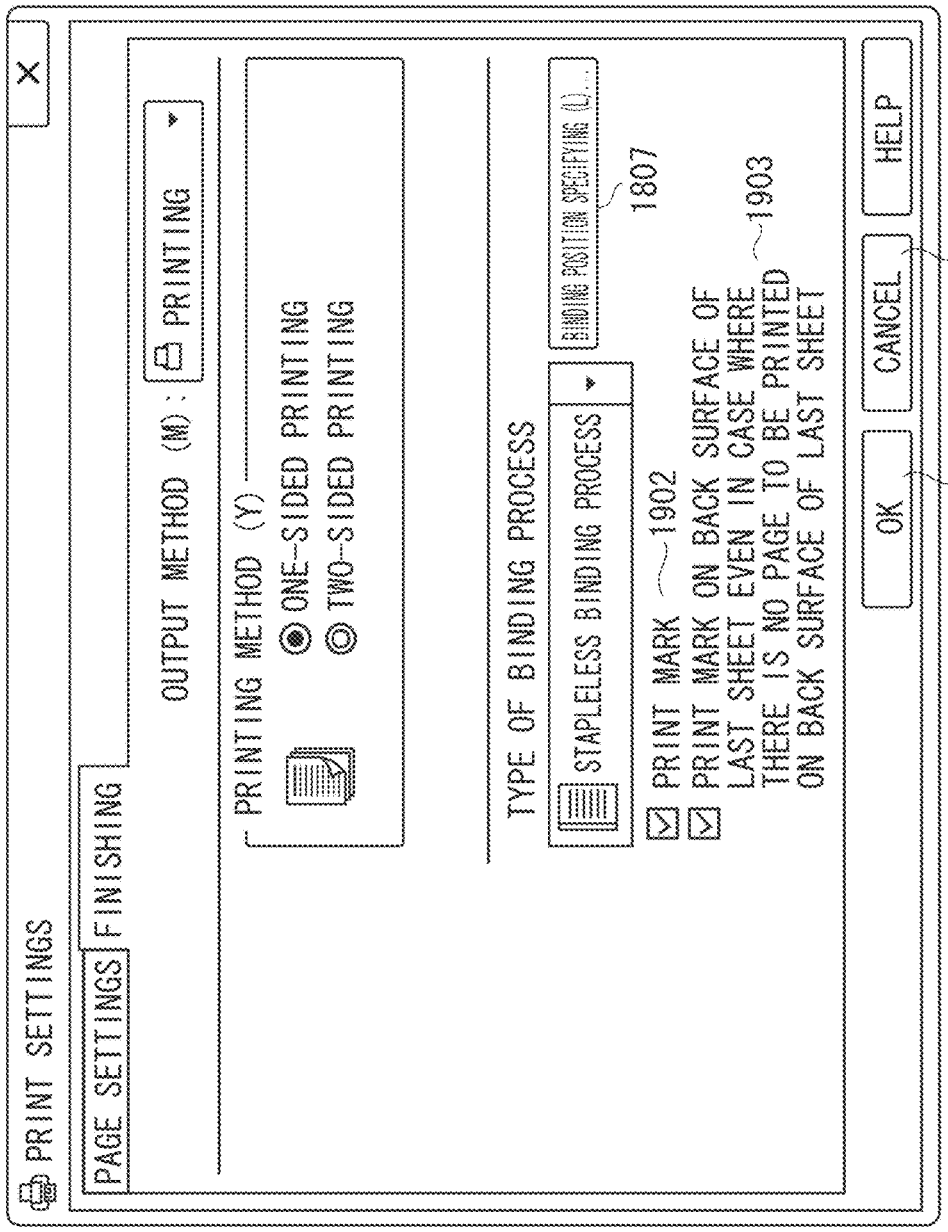

PRINT SETTINGS
PAGE SETTINGS
FINISHING
OUTPUT METHOD (M):
PRINTING
PRINTING METHOD (Y)
ONE-SIDED PRINTING
TWO-SIDED PRINTING
TYPE OF BINDING PROCESS
STAPLELESS BINDING PROCESS
BINDING POSITION SPECIFYING (L...
1807
PRINT MARK
1902
PRINT MARK ON BACK SURFACE OF LAST SHEET EVEN IN CASE WHERE THERE IS NO PAGE TO BE PRINTED ON BACK SURFACE OF LAST SHEET
1903
OK
CANCEL
HELP
1803
1804

FIG. 19A

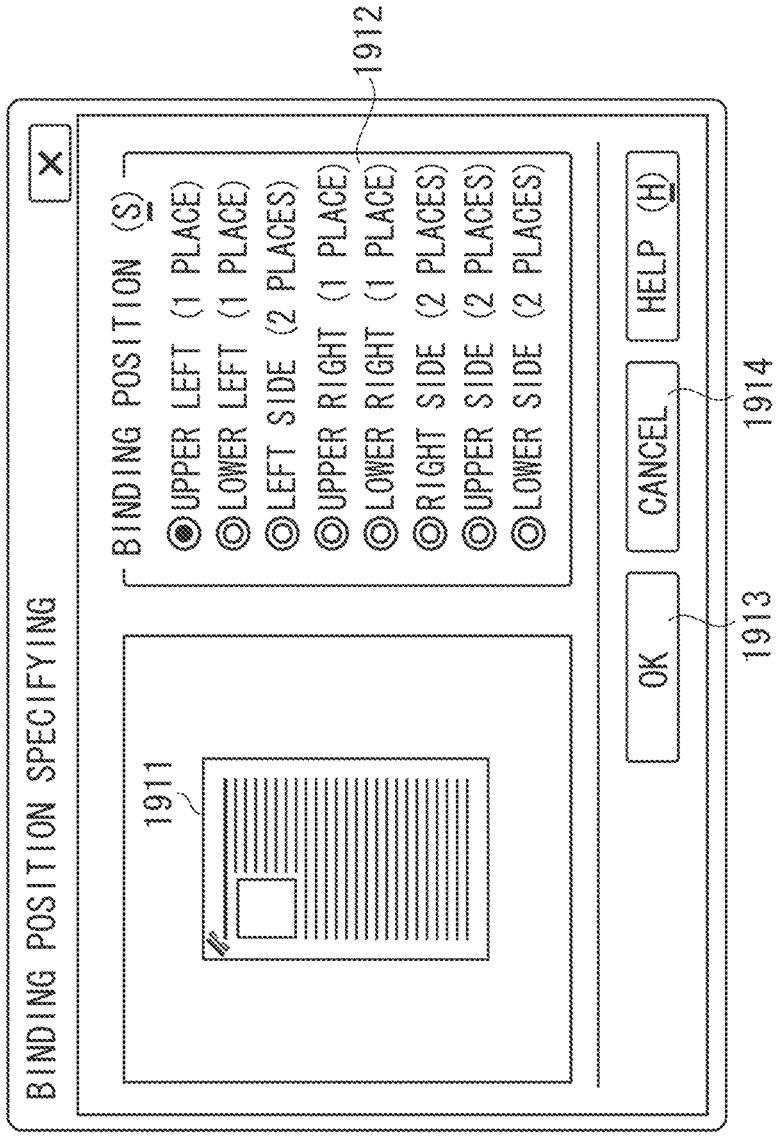

BINDING POSITION SPECIFYING
BINDING POSITION (S)
UPPER LEFT (1 PLACE)
LOWER LEFT (1 PLACE)
LEFT SIDE (2 PLACES)
UPPER RIGHT (1 PLACE)
LOWER RIGHT (1 PLACE)
RIGHT SIDE (2 PLACES)
UPPER SIDE (2 PLACES)
LOWER SIDE (2 PLACES)
1911
1912
OK
CANCEL
HELP (H)
1913
1914

FIG. 19B

FIG. 20

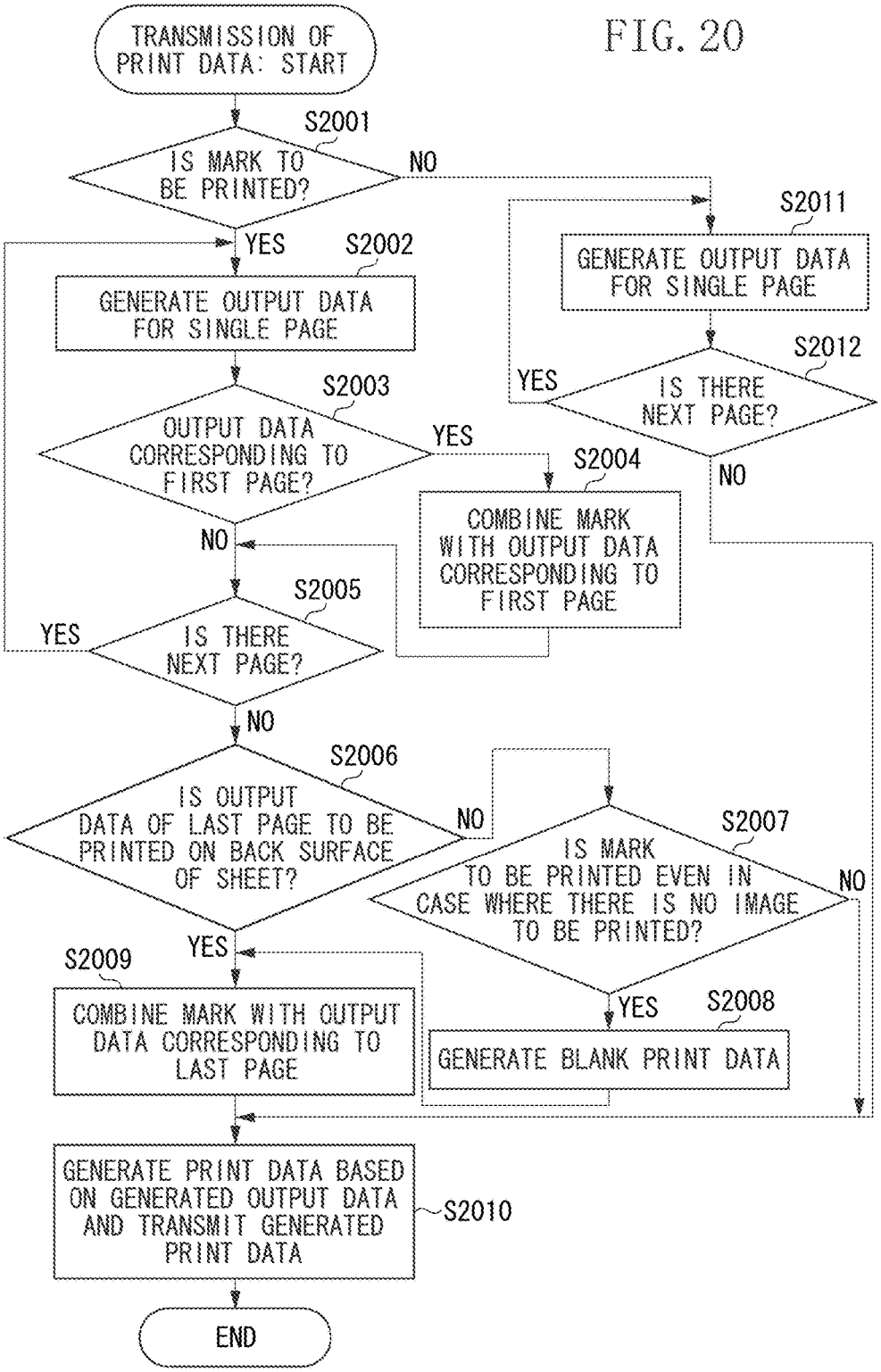

TRANSMISSION OF PRINT DATA: START
S2001
IS MARK TO BE PRINTED?
NO
YES
S2002
GENERATE OUTPUT DATA FOR SINGLE PAGE
S2003
OUTPUT DATA CORRESPONDING TO FIRST PAGE?
YES
S2004
COMBINE MARK WITH OUTPUT DATA CORRESPONDING TO FIRST PAGE
NO
S2005
IS THERE NEXT PAGE?
YES
NO
S2006
IS OUTPUT DATA OF LAST PAGE TO BE PRINTED ON BACK SURFACE OF SHEET?
NO
YES
S2007
IS MARK TO BE PRINTED EVEN IN CASE WHERE THERE IS NO IMAGE TO BE PRINTED?
NO
YES
S2008
GENERATE BLANK PRINT DATA
S2009
COMBINE MARK WITH OUTPUT DATA CORRESPONDING TO LAST PAGE
S2010
GENERATE PRINT DATA BASED ON GENERATED OUTPUT DATA AND TRANSMIT GENERATED PRINT DATA
END
S2011
GENERATE OUTPUT DATA FOR SINGLE PAGE
S2012
IS THERE NEXT PAGE?
YES
NO

IMAGE PROCESSING APPARATUS, INFORMATION PROCESSING APPARATUS, AND CONTROL METHOD

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an image processing apparatus for performing a binding process on a plurality of sheets on which images are printed.

Description of the Related Art

There is an image processing apparatus for performing a binding process on a plurality of sheets on which images are printed. As a typical binding process, there is a staple binding process. In the staple binding process, a plurality of sheets is bound using a metal staple.

Further, as a method for binding a plurality of sheets without using a staple, there is a method for cutting a plurality of sheets together in a hollowed-out manner and tucking in the cut ends of the plurality of sheets, thereby binding the plurality of sheets (Japanese Patent Application Laid-Open No. 08-300847). There are also a method for sticking a plurality of sheets with glue, and a method for pressing a special edge against a plurality of sheets to caulk the plurality of sheets.

In a document bound using a staple, a metal staple made of a material different from that of the sheets is present at the position where the binding process is performed. Thus, it is easy to visually identify the position where the binding process is performed. On the other hand, in a document bound without using a staple, although the sheets are somewhat deformed, it is more difficult to identify the position where the binding process is performed than the case where a document is bound using a staple. Thus, if the document is turned over (opened) in the direction in which the document should not be turned over, strong force may be exerted on the binding position. As a result, the sheets may be torn or come off.

SUMMARY OF THE INVENTION

The present invention is directed to a mechanism for, if a binding process without using a staple is performed, allowing easy identification of the position where the binding process is performed.

According to an aspect of the present invention, an image processing apparatus includes a printing unit configured to print an image on a sheet, a stapleless binding unit configured to perform a stapleless binding process for binding, without using a staple, a plurality of sheets on which images are printed by the printing unit, a combining unit configured to combine, with a print target image, a mark image indicating a position where the stapleless binding process is performed, and a control unit configured to, in a case where the stapleless binding unit performs the stapleless binding process, perform control so that an image with which the mark image is combined by the combining unit is printed on a sheet.

Further features of the present invention will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram illustrating a hardware configuration of an image processing apparatus.

FIG. **2** is a cross-sectional view of the image processing apparatus.

FIG. **3** is a diagram illustrating a position where sheets are bound.

FIGS. **4**A and **4**B are diagrams illustrating a stapleless binding process performed by a stapleless binding unit.

FIG. **5** is a diagram illustrating a cross section of a plurality of bound sheets.

FIG. **6** is a top view of the plurality of bound sheets.

FIGS. **7**A and **7**B are diagrams illustrating a mark to be added to a sheet.

FIGS. **8**A and **8**B are diagrams illustrating cases where the mark is added to only a front surface of a first sheet and a back surface of a last sheet.

FIG. **9** is a diagram illustrating an operation screen displayed on an operation unit.

FIGS. **10**A and **10**B are diagrams illustrating operation screens for setting a finishing process.

FIG. **11** is a diagram illustrating an operation screen for setting addition of the mark.

FIG. **12** is a flowchart illustrating a control method for controlling a copy process.

FIG. **13** is a flowchart illustrating a setting method for setting the addition of the mark.

FIG. **14**, which is composed of FIGS. **14**A and **14**B, is a flowchart illustrating a control method for controlling execution of copying.

FIGS. **15**A and **15**B are diagrams illustrating a modified example of a mark to be added to a sheet.

FIG. **16** is a block diagram illustrating a hardware configuration of an information processing apparatus.

FIG. **17** is a flowchart illustrating a control method for transmitting print data to an image processing apparatus.

FIGS. **18**A and **18**B are diagrams illustrating operation screens displayed on a display.

FIGS. **19**A and **19**B are diagrams illustrating operation screens displayed on the display.

FIG. **20** is a flowchart illustrating a control method for transmitting print data to the image processing apparatus.

DESCRIPTION OF THE EMBODIMENTS

Exemplary embodiments of the present invention will be described in detail below with reference to the drawings. It is to be understood that the following exemplary embodiments are not intended to limit the scope of the invention set forth in the appended claims and that all combinations of features described in the exemplary embodiments are not necessarily essential to the technical solution provided by the present invention.

First, a first exemplary embodiment of the present invention will be described. FIG. **1** is a block diagram illustrating the hardware configuration of an image processing apparatus according to the present exemplary embodiment. The image processing apparatus has a reading function for reading an image on a sheet, and a printing function for printing an image on a sheet. The image processing apparatus also has post-processing functions such as the one for binding a plurality of sheets on which images are printed, the one for aligning a plurality of sheets, and the one for distributing the discharge destination of a plurality of sheets into a plurality of trays. Examples of a sheet include types of paper such as plain paper and thick paper, and an overhead projector (OHP) sheet.

A control unit **110** includes a central processing unit (CPU) **111**, and controls the operation of the entire image processing apparatus. The CPU **111** reads control programs

stored in a read-only memory (ROM) **112** or a storage **114** to perform various types of control such as reading control and printing control. The ROM **112** stores a control program that can be executed by the CPU **111**. A random-access memory (RAM) **113** is a main storage memory for the CPU **111** and is used as a work area or a temporary storage area for loading a control program stored in the storage **114**. The storage **114** stores image data, various programs, various types of history information, and various types of setting information. In the present exemplary embodiment, the storage **114** is assumed to be an auxiliary storage device such as a hard disk drive (HDD). Alternatively, a flash disk typified by a solid-state drive (SSD) may be used instead of the HDD.

In the image processing apparatus according to the present exemplary embodiment, it is assumed that a single CPU **111** uses a single memory (the RAM **113**) to perform processes illustrated in flowcharts described below. Alternatively, another form may be employed. For example, a plurality of CPUs, RAMs, ROMs, and storages can cooperate to perform the processes illustrated in the flowcharts described below. Further, some of the processes may be performed using a hardware circuit such as an application-specific integrated circuit (ASIC) or a field programmable gate array (FPGA).

An operation unit interface (I/F) **115** connects an operation unit **116** and the control unit **110**. The operation unit **116** displays information to a user and inputs an instruction from the user. To this end, the operation unit **116** includes a touch panel display for displaying operation screens to be described below, and various hardware keys such as a start button and a setting button. The user presses a key displayed on the touch panel display. Alternatively, the operation unit **116** may include a display and various hardware keys instead of the touch panel display. In this case, the user inputs an instruction using the hardware keys. Yet alternatively, the operation unit **116** may include only a touch panel display.

A reading unit I/F **117** connects a reading unit **118** and the control unit **110**. The reading unit **118** reads an image on a sheet and converts the read image into image data such as binary data. The image data generated by the reading unit **118** is stored into the storage **114** or the RAM **113** of the control unit **110** via the reading unit I/F **117**. Then, the image data is transmitted to an external apparatus via a communication unit I/F **123** or printed on a sheet.

A printing unit I/F **119** connects a printing unit **120** and the control unit **110**. Image data to be printed (print target image data) is transferred from the control unit **110** to the printing unit **120** via the printing unit I/F **119**. The printing unit **120** prints, on a sheet, an image based on the image data.

A sheet processing unit I/F **121** connects a sheet processing unit **122** and the control unit **110**. The sheet processing unit **122** receives a control command from the CPU **111** and performs post-processing on a sheet according to the received control command. For example, the sheet processing unit **122** aligns a plurality of sheets, distributes the discharge destination of a plurality of sheets into a plurality of trays, and binds a plurality of sheets. In the present exemplary embodiment, the sheet processing unit **122** can perform a staple binding process for binding a plurality of sheets with a staple, and a stapleless binding process for binding a plurality of sheets without using a staple.

Further, the control unit **110** is connected to a local area network (LAN) **100** via the communication unit I/F **123**. The communication unit I/F **123** transmits image data and information to an external apparatus (an email server, a file server, or a personal computer (PC)) on the LAN **100**, and receives image data and information from an external apparatus on the LAN **100**. Further, the communication unit I/F **123** communicates with an external apparatus via a network such as a wireless LAN (not illustrated) and communicates with an external apparatus via a local interface such as a Universal Serial Bus (USB) interface. The image data received by the communication unit I/F **123** is stored into the storage **114**.

FIG. **2** is a cross-sectional view of the image processing apparatus. In FIG. **2**, the control unit **110**, the operation unit **116**, and the reading unit **118** are omitted. In FIG. **2**, the sheet processing unit **122** is placed inside the housing of the image processing apparatus. The placement of the sheet processing unit **122**, however, is not limited to the example of FIG. **2**. The sheet processing unit **122** may be connected adjacent to the image processing apparatus.

Sheet feeding units **201** and **202** each store a sheet. Although the image processing apparatus includes two sheet feeding units in FIG. **2**, the number of sheet feeding units is not limited to two. Conveyance rollers **203** convey the sheet stored in the sheet feeding unit **201** to the printing unit **120**. Further, conveyance rollers **204** convey the sheet stored in the sheet feeding unit **202** to the printing unit **120**. The printing unit **120** prints an image on the first surface of the conveyed sheet. The printing unit **120** may employ an ink-jet method of spraying ink onto a sheet to print an image, or an electrophotographic method of fixing toner onto a sheet to print an image.

In the case of one-sided printing, the sheet subjected to printing is guided to conveyance rollers **205** and **206**, and the conveyance rollers **205** and **206** convey the sheet to the sheet processing unit **122**. The sheet guided by the conveyance rollers **206** is discharged to an intermediate tray **220**.

The intermediate tray **220** is provided with a slope by locating the downstream side (the upper left side in FIG. **2**), in the sheet discharge direction, of the intermediate tray **220** in an upper portion in the vertical direction and locating the upstream side (the lower right side in FIG. **2**), in the sheet discharge direction, of the intermediate tray **220** in a lower portion in the vertical direction. This enables the intermediate tray **220** to hold a plurality of sheets. Further, the intermediate tray **220** includes a bundle discharge roller pair **218**, which includes a set of an upper bundle discharge roller **218***a* and a lower bundle discharge roller **218***b*, which are disposed on the downstream side of the intermediate tray **220**. The intermediate tray **220** also includes a drawing paddle **215**, which is disposed above an intermediate portion of the intermediate tray **220**. The upper bundle discharge roller **218***a* is supported by a swinging guide **217**.

The bundle discharge rollers **218***a* and **218***b* receive, onto the intermediate tray **220**, a sheet P from the conveyance rollers **206** with the upper bundle discharge roller **218***a* being separated from the lower bundle discharge roller **218***b* by swinging control of the swinging guide **217**.

Further, aligning members **221** are provided on the near side and the far side of the intermediate tray **220** in the width direction of the intermediate tray **220**, which is orthogonal to the sheet conveying direction. The aligning members **221** move in the width direction by a front alignment motor (not illustrated) and a rear alignment motor (not illustrated). The "near side" refers to a portion on the near side of the plane of the paper when the image processing apparatus is viewed in the direction illustrated in FIG. **2**, and the "far side" refers to a portion on the far side of the plane of the paper.

The sheet P guided by the conveyance rollers **206** and discharged onto the intermediate tray **220** slides down on a

stacking surface of the intermediate tray **220** or on sheets stacked on the intermediate tray **220**, by the slope of the intermediate tray **220** and the action of the drawing paddle **215**. The sheet P discharged onto the intermediate tray **220** is subjected to an aligning process by the aligning members **221** while sliding down, and stops by the rear end (the upstream end in the discharge direction) of the sheet P hitting a stopper **216**.

A sheet bundle aligned on the intermediate tray **220** is subjected to a binding process by a stapleless binding unit **214**, where necessary. The stapleless binding unit **214** is configured to be movable along the outer periphery of the intermediate tray **220** in a direction perpendicular to the sheet conveying direction, and can move to a binding position specified by the user. Further, the stapleless binding unit **214** can bind a rear end portion, in the conveying direction, of the sheet bundle held on the intermediate tray **220**.

The sheet bundle subjected to post-processing such as a binding process by the sheet processing unit **122** is discharged onto a discharge unit **207**. The swinging guide **217** swings so that the bundle discharge roller **218***a* abuts the top sheet on the intermediate tray **220**. The bundle discharge roller pair **218** is driven to rotate in this abutting state, thereby discharging the sheet bundle subjected to the post-processing onto the discharge unit **207**.

Next, in the case of two-sided printing, the sheet of which the first surface is subjected to printing by the printing unit **120** is guided to conveyance rollers **208**, and the conveyance rollers **208** convey the sheet to conveyance rollers **209**. The conveyance rollers **209** convey the sheet to a reversing path **210**. If the rear end of the sheet reaches the conveyance rollers **209**, the conveyance rollers **209** start rotating backward and convey the sheet to conveyance rollers **211**. The conveyance rollers **211** convey the sheet to conveyance rollers **213** via a two-sided printing conveyance path **212**. The conveyance rollers **213** convey the sheet to the printing unit **120**. The printing unit **120** prints an image on the second surface of the sheet. The sheet subjected to two-sided printing is guided to the conveyance rollers **205** and **206**, and the conveyance rollers **205** and **206** convey the sheet to the sheet processing unit **122**. Then, the sheet is subjected to post-processing such as a binding process similarly to the case of one-sided printing.

FIG. **3** is a diagram illustrating a binding position of the stapleless binding unit **214**. FIG. **3** illustrates a plurality of sheets **303**. The sheet processing unit **122** is configured to move the stapleless binding unit **214** to the binding position according to information about a binding process that is received from the CPU **111** to bind the plurality of sheets **303**. For example, in FIG. **3**, a current position **310** of the stapleless binding unit **214** is indicated by a solid line. The CPU **111** can move the stapleless binding unit **214** to, for example, positions **311** and **312**, and cause the stapleless binding unit **214** to bind the plurality of sheets **303** at the positions **311** and **312** without using a staple.

FIGS. **2** and **3** illustrate only the stapleless binding unit **214** (a first binding unit) as an example of a binding unit. Alternatively, a staple binding unit (a second binding unit (not illustrated)) may be further included. Further, the staple binding unit and the stapleless binding unit **214** may be included as a single unit in the sheet processing unit **122**. Further, FIG. **3** illustrates an area where the stapleless binding unit **214** can move. Alternatively, the movement area of the stapleless binding unit **214** may be wider than illustrated in FIG. **3**. Further, if the stapleless binding unit **214** and the staple binding unit (not illustrated) are included as different units, a retreat area for preventing the physical interference between these units may be provided.

FIGS. **4**A and **4**B are diagrams illustrating a stapleless binding process performed by the stapleless binding unit **214**. In the stapleless binding process, the stapleless binding unit **214** applies pressure to the plurality of sheets **303** from above and below to bind the plurality of sheets **303** in close contact with each other. FIG. **4**A illustrates a state where the stapleless binding unit **214** moves to the binding position for binding the plurality of sheets **303**. An upper metal mold **401** presses down the plurality of sheets **303** from above. In the upper metal mold **401**, a plurality of protruding edges **402** are arranged, and each edge **402** applies pressure to the sheets **303**. A lower metal mold **405** presses down the plurality of sheets **303** from below. In the lower metal mold **405**, a plurality of recessed portions **404**, which correspond to the plurality of respective edges **402**, are arranged, and each recessed portion **404** receives the corresponding edge **402**.

FIG. **4**B illustrates a state where the upper metal mold **401** and the lower metal mold **405** apply pressure to the plurality of sheets **303** from above and below. The upper metal mold **401** and the lower metal mold **405** apply pressure to the plurality of sheets **303**, thereby enabling the binding of the plurality of sheets **303**. The plurality of edges **402** and the plurality of recessed portions **404** apply pressure to a plurality of points in the sheets **303**, thereby preventing the sheets **303** from coming off. In the present exemplary embodiment, the stapleless binding unit **214** is a binding unit for applying pressure to a plurality of sheets to bind the plurality of sheets in close contact with each other. The binding process of the present invention, however, is not limited to this. Alternatively, for example, the binding process may be achieved by sticking a plurality of sheets with glue or adhesive.

FIG. **5** is a diagram illustrating a cross section of a binding position portion of the sheets **303** subjected to the binding process. The binding position portion is bound by the upper metal mold **401** and the lower metal mold **405** applying pressure to and crushing a plurality of points in the sheets **303**. FIG. **6** is a top view of the plurality of bound sheets **303**. A binding position **601** indicates a position where the binding process is performed. Arrows **602** and **603** illustrate examples of the directions of external forces applied when the sheets **303** are turned over (opened), and indicate in which directions the sheet bundle is turned over. The direction of the arrow **602** indicates the direction in which the binding strength is great. Even if a force in the direction of the arrow **602** is applied to the binding position **601** when a viewer turns over the sheets **303**, the sheets **303** are unlikely to come off. On the other hand, the direction of the arrow **603** indicates the direction in which the binding strength is small. If a force in the direction of the arrow **603** is applied to the binding position **601** when the viewer turns over the sheets **303**, the sheets **303** are likely to come off.

In FIG. **6**, the deformation of the sheets **303** at the binding position **601** is indicated in gray. However, what can actually be visually recognized is the trace of the deformation by the pressure of the upper metal mold **401** and the lower metal mold **405**. When the plurality of sheets **303** thus bound without using a staple are read by the viewer, the trace of the deformation left on the binding position **601** appears differently depending on the angle of the ambient light. Thus, depending on the angle of the ambient light, it may be difficult to visually identify which part of the sheets **303** is bound. If the viewer overlooks the fact that the sheets **303** are bound, the viewer may recognize and treat the sheets **303**

as a plurality of unbound sheets. For example, suppose that the viewer reads a plurality of unbound sheets. If the viewer finishes reading the first sheet of the plurality of sheets, then to read the second sheet, the viewer may perform the action of moving the first sheet from the lower left to the upper right in FIG. **6** to place the first sheet to the end of the plurality of sheets. Thus, if the viewer performs such an action on the plurality of bound sheets **303**, a strong force is applied in the direction of the arrow **603**, in which the binding strength is small. Thus, the sheets **303** may come off.

As described above, it is difficult to recognize that the sheets **303** are bound if bound by the stapleless binding unit **214**. Thus, if the sheets **303** are turned over in the direction in which the sheets **303** should not be turned over, the sheets **303** may come off. To address this problem, in the present exemplary embodiment, a mark **701** is printed, which allows easy identification of the position where the binding process is performed.

FIGS. **7**A and **7**B are diagrams illustrating examples of a mark to be added to the sheets. When viewing the sheets **303**, the viewer can visually recognize the mark **701** and identify the position of the binding process and the binding direction. In the present exemplary embodiment, the design of the mark **701** suggests a metal staple. The design of the mark **701**, however, is not limited to this. The mark **701** only needs to allow the viewer to recognize that the binding process is performed. Further, FIGS. **7**A and **7**B illustrate cases where the mark **701** is printed in black. Alternatively, the mark **701** may be printed in another color. Yet alternatively, based on an image on the page on which the mark **701** is to be printed, the mark **701** may be printed in a color different from the background color. Further, the addition of the mark **701** may be achieved not only by printing but also by imprinting a stamp. In this case, for example, the stapleless binding unit **214** may include a stamp for imprinting the mark **701** and imprint the mark **701** before or after performing the binding process.

Next, the description will be given of an addition position where the mark **701** is added. FIG. **7**A illustrates an area **702** as an example of an area where the printing unit **120** can perform printing. When the printing unit **120** performs printing, there is an area where printing cannot be performed in an outer portion of the sheets **303** due to a factor such as the conveyance of the sheets **303**. The area **702** indicates the range where printing can actually be performed on the sheets **303**. An area **703** is an area including the binding position **601** of the plurality of sheets **303** and the mark **701**. The binding position **601** is pressed by the stapleless binding unit **214** at the position of coordinates (Xb, Yb) with the origin located at the upper left corner of the sheets **303**. On the other hand, the mark **701** is printed at a position slightly shifted from the binding position **601**. This is to, when the sheets are pressure-bonded together by the stapleless binding process, prevent toner or ink from entering the space between the sheets to reduce the binding strength. This is also to, in a case where the stapleless binding unit **214** employs a method of binding sheets with glue, prevent toner or ink from being mixed with the glue portion to reduce the adhesive strength. Further, when the printing unit **120** adds the mark **701**, the printing unit **120** prints the mark **701** such that the entire mark **701** is placed on the inner side of the sheet than coordinates (Xa, Ya) with the origin located at the upper left corner of the sheets **303**.

In the present exemplary embodiment, the description is given of an example case where the mark **701** is printed at the coordinates on slightly inner side of the sheet than the binding position **601**. The position of the mark **701**, however, is not limited to this. If the binding process is performed in the area **702** where printing can be performed, the mark **701** may be printed at a position overlapping the binding position **601**. The mark **701** only needs to be printed near the binding position **601** and in the area **702** where printing can be performed by the printing unit **120**. If the mark **701** is realized using a stamp, the position of the mark **701** is not limited to the area **702**. The mark **701** is only required to be imprinted near the binding position **601**.

Further, FIG. **7**B illustrates examples of another binding position and another printing position of the mark **701** in the present exemplary embodiment. For example, the binding process may be performed on a plurality of places in the sheets **303**. Further, FIG. **7**A illustrates an example of the binding process of binding the sheets **303** in an oblique direction. Alternatively, for example, the sheets **303** may be bound parallel to the long side of the sheets **303**, or may be bound parallel to the short side of the sheets **303**.

FIGS. **8**A and **8**B are diagrams illustrating examples of cases where the mark is added only to the front surface of the first sheet and the back surface of the last sheet. FIG. **8**A illustrates a case where the binding process is performed on the upper left end of the front surface of the first sheet. A sheet **801** is the first sheet of a sheet bundle and has a front surface **801***a* and a back surface **801***b*. A sheet **802** is the last sheet of the sheet bundle and has a front surface **802***a* and a back surface **802***b*.

The mark to be added to the back surface of the last sheet is printed at a position line-symmetric to the position of the mark to be added to the front surface of the first sheet with respect to a central axis **803** of the sheets as an axis of symmetry. In the present exemplary embodiment, it is assumed that the design of the mark **701** suggests a metal staple. Thus, an image corresponding to the mark is appropriately rotated according to the direction of the binding process and then printed.

FIG. **8**B is a diagram illustrating examples of the relationship between the binding position and the printing position of the mark. For example, if the binding process is performed on the upper left end of the sheets as viewed from the front side of the sheet bundle, the mark is printed at a position **811***a* on the front surface of the first sheet. The mark is also printed at a position **811***b* on the back surface of the last sheet. For example, if the binding process is performed on two places at the left end of the sheets as viewed from the front side of the sheet bundle, the mark is printed at positions **812***a* on the front surface of the first sheet. The mark is also printed at positions **812***b* on the back surface of the last sheet.

Next, the settings of the printing of the mark will be described. The user presses a setting/registration button (not illustrated) of the operation unit **116** and thereby can change settings regarding the function of the image processing apparatus. As an item of settings for controlling a printing operation, the user can make settings regarding the printing of the mark when the stapleless binding process is performed.

If the user selects, on a setting/registration screen (not illustrated), mark print settings when the stapleless binding process is performed, the CPU **111** performs a control process based on a flowchart in FIG. **13**. Each operation (step) illustrated in the flowchart in FIG. **13** is achieved by the CPU **111** loading a control program stored in the ROM **112** or the storage **114** into the RAM **113** and executing the control program.

First, in step S**1301**, the CPU **111** controls the operation unit **116** to display an operation screen **1101** for setting the

mark to be added to the sheets. FIG. **11** is a diagram illustrating an example of the operation screen displayed in step **S1301**.

Via the operation screen **1101** in FIG. **11**, the user can set whether the mark is to be added in a case where the stapleless binding process is performed. In the present exemplary embodiment, the contents set on the screen **1101** in FIG. **11** are held in the storage **114** or the RAM **113** as common settings in a case where the apparatus performs the stapleless binding process. The setting of whether the mark is to be added may be made with respect to each job via, for example, screens illustrated in FIGS. **10**A and **10**B as examples.

Keys **1102** and **1103** are keys for setting whether the mark is to be printed in a case where the binding process without using a staple is performed. To make a setting so that the mark is to be printed, the user presses the key **1102**. To make a setting so that the mark is not to be printed, the user presses the key **1103**. The keys **1102** and **1103** perform a toggle operation, and only one of the keys is set to enabled. Keys **1104** and **1105** also perform a similar toggle operation. FIG. **11** illustrates an example case where the keys **1102** and **1104** are set to enabled.

Further, the keys **1104** and **1105** are keys for setting whether the mark is to be printed in a case where there is no image to be printed on the back surface of the last sheet. These keys are used to set whether only the mark is to be printed in a case where a normal print process is not performed on the back surface of the last sheet, such as a case where the number of pages to be subjected to two-sided printing is an odd number, or a case where printing is performed only on one side.

In the present exemplary embodiment, if there is an image to be printed on the back surface of the last sheet, the mark is added to the back surface of the last sheet. The present invention, however, is not limited to this. For example, even if there is an image to be printed on the back surface of the last sheet, the mark may be added only to the front surface of the first sheet.

Referring back to FIG. **13**, in step **S1302**, the CPU **111** determines whether either the key **1102** or **1103** is pressed. If the CPU **111** determines that either the key **1102** or **1103** is pressed (YES in step **S1302**), the processing proceeds to step **S1303**. If, on the other hand, the CPU **111** determines that neither the key **1102** nor the key **1103** is pressed (NO in step **S1302**), the processing proceeds to step **S1304**.

In step **S1303**, the CPU **111** changes the setting of the printing of the mark. If the key **1102** is pressed, the CPU **111** sets the printing of the mark to enabled. If the key **1103** is pressed, the CPU **111** sets the printing of the mark to disabled.

In step **S1304**, the CPU **111** determines whether either the key **1104** or **1105** is pressed. If the CPU **111** determines that either the key **1104** or **1105** is pressed (YES in step **S1304**), the processing proceeds to step **S1305**. If, on the other hand, the CPU **111** determines that neither the key **1104** nor the key **1105** is pressed (NO in step **S1304**), the processing proceeds to step **S1306**.

In step **S1305**, the CPU **111** sets whether the mark is to be printed on the back surface of the last sheet in a case where there is no image to be printed on the back surface of the last sheet. If the key **1104** is pressed, the CPU **111** sets the printing of the mark on the back surface of the last sheet to enabled even in a case where there is no image to be printed on the back surface of the last sheet. If, on the other hand, the key **1105** is pressed, the CPU **111** sets the printing of the mark on the back surface of the last sheet to disabled in a case where there is no image to be printed on the back surface of the last sheet.

In step **S1306**, the CPU **111** determines whether a key **1106** is pressed. If the CPU **111** determines that the "OK" key **1106** is pressed (YES in step **S1306**), the processing proceeds to step **S1307**. If the CPU **111** determines that the "OK" key **1106** is not pressed (NO in step **S1306**), the processing proceeds to step **S1308**. In step **S1307**, the CPU **111** stores, into the storage **114** or the RAM **113**, the settings selected by the user as setting values, and ends the control of the settings of the mark.

In step **S1308**, the CPU **111** determines whether a key **1107** is pressed. If the CPU **111** determines that the "setting cancellation" key **1107** is pressed (YES in step **S1308**), the processing proceeds to step **S1309**. If the CPU **111** determines that the "setting cancellation" key **1107** is not pressed (NO in step **S1308**), the processing returns to step **S1302**. In step **S1309**, the CPU **111** discards the settings made via the screen **1101** in FIG. **11**, and ends the control of the settings of the mark.

Next, the control of the binding process will be described using a copy function of the image processing apparatus according to the present exemplary embodiment. FIGS. **9**, **10**A, and **10**B are diagrams illustrating examples of operation screens displayed on the operation unit **116**. Each operation screen will be described with a control method for controlling copying, which will be described below. FIGS. **12** and **14** are flowcharts illustrating a control method for controlling the execution of copying. Each operation (step) illustrated in the flowcharts in FIGS. **12** and **14** is achieved by the CPU **111** loading a control program stored in the ROM **112** or the storage **114** into the RAM **113** and executing the control program.

If the user selects copying on a main screen (not illustrated) displayed on the operation unit **116**, the CPU **111** executes this control program. First, in step **S1201**, the CPU **111** controls the operation unit **116** to display an operation screen for setting copying. FIG. **9** is a diagram illustrating an example of a copy setting screen displayed in step **S1201**. Via the screen in FIG. **9**, the user can select color copying or monochrome copying, set the magnification for copying, and select the type of two-sided copying. To set finishing for the copy process, the user presses a key **901**.

In step **S1202**, the CPU **111** determines whether the key **901** is pressed on the screen in FIG. **9**. If the key **901** is pressed (YES in step **S1202**), the processing proceeds to step **S1203**. If the key **901** is not pressed (NO in step **S1202**), the processing proceeds to step **S1209**. In step **S1203**, the CPU **111** controls the operation unit **116** to display an operation screen illustrated in FIG. **10**A. FIG. **10**A is a diagram illustrating an example of the operation screen displayed on the operation unit **116**. Further, FIG. **10**B is a diagram illustrating an example of an operation screen to which the screen in FIG. **10**A transitions. Via the operation screens in FIGS. **10**A and **10**B, the user sets finishing when copying is performed.

In step **S1204**, the CPU **111** receives the settings of finishing via the screens in FIGS. **10**A and **10**B. A key **1005** is a key used to finish each copy as a set. For example, in the case of printing 10 copies of five pages, five sheets corresponding to a single copy are discharged as a single bundle. A key **1006** is a key used to finish each page as a set. For example, in the case of printing 10 copies of five pages, 10 sheets corresponding to the same page are discharged as a single bundle.

Further, a key **1001** is a key used to perform the binding process. For example, in the case of printing 10 copies of five pages, five sheets corresponding to a single copy are subjected to the binding process as a single bundle and discharged.

Keys **1002** is a key used to discard the settings of finishing made via the screens in FIGS. **10**A and **10**B. A key **1004** is a key used with one of the keys **1001**, **1005**, and **1006** being pressed to set each finishing process. If the key **1004** is pressed with the key **1001** being pressed, the screen in FIG. **10**A transitions to the screen in FIG. **10**B.

FIG. **10**B is a diagram illustrating an example of an operation screen for selecting the type and the position of the binding process. Information **1010** is information for notifying the user of the set binding position. A key **1007** is a key for selecting the staple binding process. A key **1008** is a key for selecting the stapleless binding process. Further, keys **1011** to **1014** are keys for selecting the binding position.

Further, a key **1015** is a key used to set, as setting values of a job, the settings of finishing made via the screens in FIGS. **10**A and **10**B. A key **1016** is a key used to return to the screen in FIG. **10**A. A key **1017** is a key used to discard the settings of finishing made via the screens in FIGS. **10**A and **10**B.

Referring back to FIG. **12**, in step S**1204**, in response to the pressing of keys by the user via the screens in FIGS. **10**A and **10**B, the CPU **111** receives the settings of a finishing process. For example, if the key **1007** is pressed, the CPU **111** receives the use of the staple binding process. If, on the other hand, the key **1008** is pressed, the CPU **111** receives the use of the stapleless binding process.

If any one of the keys **1011** to **1014** is pressed, the CPU **111** receives the setting of the binding position corresponding to the pressed key. If the key **1011** is pressed, the CPU **111** sets the position where the binding process is to be performed to the upper left end. Further, if the key **1012** is pressed, the CPU **111** sets the lower left end as a binding position. If the key **1013** is pressed, the CPU **111** sets the upper right end as a binding position. If the key **1014** is pressed, the CPU **111** sets the lower right end as a binding position.

In FIG. **10**B, the description has been given of an example case where each corner of the sheets is set as the binding position. The binding position, however, is not limited to these positions. Alternatively, for example, two places on the long side or the short side of the sheets may be settable as the binding position. Further, a direction other than an oblique direction may be settable as the binding direction. Further, in the present exemplary embodiment, the description has been given of an example where the keys **1011** to **1014** are pressed to set the binding position. Alternatively, for example, when the information **1010** is pressed via the operation unit **116**, the binding position may be set based on the pressed position.

Referring back to FIG. **12**, in step S**1205**, the CPU **111** determines whether the key **1015** is pressed. If the CPU **111** determines that the "OK" key **1015** is pressed (YES in step S**1205**), the processing proceeds to step S**1206**. If the CPU **111** determines that the "OK" key **1115** is not pressed (NO in step S**1205**), the processing proceeds to step S**1207**. In step S**1206**, the CPU **111** holds, in the RAM **113**, the contents set or selected by the user as setting values of a job, and ends the setting of the finishing process, and the processing returns to step S**1201**.

On the other hand, in step S**1207**, the CPU **111** determines whether the key **1017** is pressed. If the CPU **111** determines that the "setting cancellation" key **1017** is pressed (YES in step S**1207**), the processing proceeds to step S**1208**. If the CPU **111** determines that the "setting cancellation" key **1017** is not pressed (NO in step S**1207**), the processing returns to step S**1204**, in which the CPU **111** receives the settings of the finishing from the user.

In step S**1208**, the CPU **111** discards the contents set or selected by the user, and ends the setting of the finishing process, and the processing returns to step S**1201**.

Next, the description will be given of a case where it is determined in step S**1202** that the key **901** is not pressed (No in step S**1202**). If the key **901** is not pressed on the screen in FIG. **9**, the processing proceeds to step S**1209**. In step S**1209**, the CPU **111** determines whether a start button (not illustrated) is pressed. The start button is provided in the operation unit **116**. If the start button is pressed (YES in step S**1209**), the processing proceeds to step S**1210**. In step S**1210**, the CPU **111** executes copying according to setting values of a copy job held in the RAM **113**. The execution of copying will be described with reference to a flowchart in FIG. **14**. If, on the other hand, the start button is not pressed (NO in step S**1209**), the processing returns to step S**1201**.

If the CPU **111** determines in step S**1209** that the start button (not illustrated) is pressed on the screen in FIG. **9**, the CPU **111** performs a control process based on the flowchart in FIG. **14**.

In step S**1401**, the CPU **111** determines whether the binding process is set for the job. If the binding process is set (YES in step S**1401**), the processing proceeds to step S**1402**. If the binding process is not set (NO in step S**1401**), the processing proceeds to step S**1412**. In step S**1402**, the CPU **111** determines whether the stapleless binding process is set for the job. If the stapleless binding process is set (YES in step S**1402**), the processing proceeds to step S**1403**. If the stapleless binding process is not set (the staple binding process is set) (NO in step S**1402**), the processing proceeds to step S**1412**. If the image processing apparatus includes only the stapleless binding unit **214** as a binding unit for performing the binding process, the process of step S**1402** is not performed, and the processing proceeds to step S**1403**.

In step S**1403**, the CPU **111** acquires the setting value regarding the printing of the mark when the stapleless binding process is performed, the setting value stored in the storage **114** or the RAM **113**. Then, the CPU **111** determines whether a setting is made so that the mark is to be printed in a case where the stapleless binding process is performed. If the setting of the printing of the mark is set to enabled (YES in step S**1403**), the processing proceeds to step S**1404**. If the setting of the printing of the mark is set to disabled (NO in step S**1403**), the processing proceeds to step S**1412**. The setting value regarding the printing of the mark when the stapleless binding process is performed can be set by the user selecting either the key **1102** or **1103** via the above-described screen **1101** in FIG. **11**.

In step S**1412**, the CPU **111** transmits to the reading unit **118** a control command for reading a sheet. The reading unit **118** reads an image on the sheet and generates image data according to the control command. Then, the reading unit **118** stores the image data into an area (a storage unit) on the storage **114** or the RAM **113** for storing image data.

In step S**1413**, the CPU **111** determines whether there is a next page. If it is determined that there is a next page (YES in step S**1413**), the processing returns to step S**1412**, in which the CPU **111** reads the next page. If, on the other hand, it is determined that there is no next page (NO in step S**1413**), the processing proceeds to step S**1414**. In step S**1414**, the CPU **111** transfers the image data stored in the storage unit to the printing unit **120**. The printing unit **120**

performs printing based on the image data. If the printing of the read image data is completed, the processing proceeds to step **S1415**.

In step **S1415**, the CPU **111** transmits a control command to the sheet processing unit **122**. The sheet processing unit **122** performs a finishing process such as a sorting process, a stapleless binding process, or a staple binding process based on the control command, then discharges a sheet bundle to the discharge unit **207**, and ends the copy process.

If, on the other hand, it is determined in step **S1403** that the mark is to be printed (YES in step **S1403**), the processing proceeds to step **S1404**. In step **S1404**, the CPU **111** reads an image on a sheet, generates image data, and stores the image data into a storage unit. In step **S1405**, the CPU **111** determines whether the image data generated in step **S1404** is image data to be printed on the front surface page of the first sheet. If the generated image data is image data to be printed on the front surface of the first sheet (YES in step **S1405**), the processing proceeds to step **S1406**. If the generated image data is not image data to be printed on the front surface of the first sheet (NO in step **S1405**), the processing proceeds to step **S1407**.

In step **S1406**, according to setting information of the binding position set for the job, the CPU **111** determines the position where the mark image is to be added and the orientation of the mark. Then, the CPU **111** combines the mark image with the image data. For example, as a setting of the binding process, if a setting is made so that an oblique binding process is to be performed at the upper left end as illustrated in FIG. **7**A as an example, the printing unit **120** combines the mark image with the image data at coordinates (Xc, Yc).

On the other hand, in step **S1407**, the CPU **111** determines whether there is a next page. If it is determined that there is a next page (YES in step **S1407**), the processing returns to step **S1404**, in which the CPU **111** generates image data of the next page. If, on the other hand, it is determined that there is no next page (NO in step **S1407**), the processing proceeds to step **S1408**. In step **S1408**, the CPU **111** determines whether the image data corresponding to the last page is to be printed on the back surface of a sheet. Specifically, if two-sided printing is set for the job and the number of pages is an even number, the CPU **111** determines that the image data corresponding to the last page is to be printed on the back surface of a sheet (YES in step **S1408**), and the processing proceeds to step **S1411**. If, on the other hand, one-sided printing is set for the job, or if two-sided printing is set for the job and the number of pages is an odd number, the CPU **111** determines that the image data corresponding to the last page is not to be printed on the back surface of a sheet (NO in step **S1408**), and the processing proceeds to step **S1409**.

In step **S1409**, the CPU **111** determines whether a setting is made so that the mark is to be printed in a case where there is no image to be printed on the back surface of the last sheet. If a setting is made so that the mark is to be printed in a case where there is no image to be printed on the back surface of the last sheet (YES in step **S1409**), the processing proceeds to step **S1410**. If, on the other hand, a setting is not made so that the mark is to be printed (NO in step **S1409**), the processing proceeds to step **S1414**, in which the CPU **111** performs a print process.

In step **S1410**, the CPU **111** generates blank image data for a single page. Pixel information of the image data is, for example, filled with a white level (R=255, G=255, B=255).

In step **S1411**, according to the setting information of the binding position set for the job, the CPU **111** determines the position where the mark image is to be added and the orientation of the mark. Then, the CPU **111** combines the mark image with the image data. For example, as a setting of the binding process, if a setting is made so that an oblique binding process is to be performed at the upper left end as illustrated in FIG. **8**A, the CPU **111** combines the mark rotated by 90 degrees with the image data at the position **811***b*.

In step **S1414**, the CPU **111** transfers the image data stored in the storage unit to the printing unit **120**. The printing unit **120** performs printing based on the image data. If the printing of the read image data is completed, the processing proceeds to step **S1415**. In step **S1415**, the printing unit **120** and the sheet processing unit **122** perform a finishing process such as a sorting process or a binding process based on a control command, and end the copy process.

In the present exemplary embodiment, the description has been given of a binding process performed in a case where copying is executed. The present invention, however, is applicable not only to copying but also to printing based on print data received from an external apparatus.

For example, the communication unit I/F **123** receives print data from an external device, and the CPU **111** stores the print data into the storage **114**. The CPU **111** controls the printing unit **120** and the sheet processing unit **122** based on the setting values regarding the printing of the mark set via the screen **1101** in FIG. **11** and held in the RAM **113** or the storage **114**, and the setting values added to the print data. It is assumed that information about the number of copies to be printed, information about the number of pages of the print data, information about two-sided printing, and information about the binding process are added to the print data.

Based on the information about the binding process added to the print data, the CPU **111** makes each determination in the flowchart illustrated in FIG. **14**. Further, in steps **S1404** and **S1412**, the CPU **111** performs the process of generating image data based on the print data.

As described above, according to the first exemplary embodiment, when sheets are bound without using a staple, a mark can be added to the sheets. Further, the user can set in advance whether the mark is to be added. Thus, according to the user's request, it is possible to switch whether the mark is to be added.

In the first exemplary embodiment, the description has been given using an example where, after all image data to be printed is stored in a storage unit, the printing unit **120** starts printing. The present invention, however, is not limited to this. For example, the present invention is also applicable to a case where reading control and printing control are performed in parallel. For example, a first control program may perform reading control in steps **S1404** to **S1413**, and a second control program may perform printing control in step **S1414**. Then, the first and second control programs may cooperate to perform a copy process. The first control program performs the processes up to the generation of image data in steps **S1404** and **S1412** and the combining of the mark image with the image data. The second control program monitors a storage unit. If the second control program detects that image data is stored, the second control program prints the stored image data. In this case, the printing of image data and the reading of image data on and after a next page can be performed in parallel. This can shorten the time required for copying.

The mark to be added in the present exemplary embodiment may have a design for guiding the direction in which the sheets should be turned over. Thus, in the present

exemplary embodiment, a mark as illustrated in FIG. **15**B may be added. FIGS. **15**A and **15**B are diagrams illustrating a modified example of the mark to be added to the sheets. FIG. **15**A is a diagram illustrating an example of the binding process using the stapleless binding unit **214**. The description will be given of an example case where the binding process is performed parallel to the long side of the sheets **303** at a position at the upper left end of the sheets **303**. A binding position **1502** indicates a position where the binding process is performed. Arrows **1503** and **1504** illustrate examples of the directions of external forces applied when the sheets **303** are turned over, and indicate in which directions the sheet bundle should be turned over. The direction of the arrow **1503** indicates the direction in which the binding strength is great.

If the binding process is performed parallel to the end of the sheets **303**, even if a force in the direction of the arrow **1503** is applied to the binding position when the viewer turns over the sheets **303**, the sheets **303** are unlikely to come off. If, on the other hand, a force in the direction of the arrow **1504** is applied to the binding position when the viewer turns over the sheets **303**, the sheets **303** are likely to come off. In this case, the viewer should be led to turn over the sheets **303** not by opening the sheets **303** from top to bottom or bottom to top, but by opening the sheets **303** from left to right or right to left.

In view of this point, in step S**1406** or S**1411** as described above, the CPU **111** may combine, with the image data, a mark indicating the direction in which the document should be turned over. For example, to lead the viewer to open the sheets **303** from left to right or right to left, a mark **1505** for guiding the direction in which the sheets **303** are turned over from left to right or right to left is printed near the binding position as illustrated in FIG. **15**B. The mark **1505** illustrated in FIG. **15**B is merely an example of the indication of the opening direction. Alternatively, any mark may be used that can indicate to the viewer the direction in which the sheets **303** should be turned over. Further, both the mark **701** and the mark **1505** may be added to the sheets **303**.

Further, in the present exemplary embodiment, the description has been given of an example case where the mark is printed on the front surface page of the first sheet and the back surface of the last sheet. The present invention, however, is not limited to this. The mark to be added in the present exemplary embodiment may be added, for example, not only to the front surface page of the first sheet and the back surface of the last sheet, but also to all the sheets. In this case, for example, the determination of whether the generated image data is image data to be printed on the first page in step S**1405** is omitted, and the mark image is combined with all the image data.

Further, in the present exemplary embodiment, the image processing apparatus includes, for example, the CPU **111**, the reading unit **118**, the printing unit **120**, and the sheet processing unit **122**. Alternatively, in an exemplary embodiment according to the present invention, a printing control apparatus for controlling the printing unit **120** and the sheet processing unit **122** may include the CPU **111**, the ROM **112**, the RAM **113**, the storage **114**, the operation unit **116**, and the communication unit I/F **123**.

In the first exemplary embodiment, the description has been given of an exemplary embodiment based on an image processing apparatus or a printing control apparatus. Alternatively, the present invention is also applicable to an information processing apparatus for transmitting print data to an image processing apparatus.

FIG. **16** is a block diagram illustrating the hardware configuration of an information processing apparatus according to a second exemplary embodiment. The information processing apparatus has the function of transmitting print data to an image processing apparatus and causing the image processing apparatus to perform printing based on the print data.

A control unit **1610** includes a CPU **1611**, and controls the operation of the entire information processing apparatus. The CPU **1611** reads a system program and an application program that are stored in a ROM **1612** or a storage **1614** to perform processing. The ROM **1612** stores a control program that can be executed by the CPU **1611**. A RAM **1613** is a main storage memory for the CPU **1611** and is used as a work area or a temporary storage area for loading various programs stored in the storage **1614**, and data and a control variable that are used in the various programs. The storage **1614** stores setting values registered by the user, management data of the information processing apparatus, application programs such as a document application and a calculation application, and a driver program for transmitting print data to the image processing apparatus. In the present exemplary embodiment, the storage **1614** is assumed to be an auxiliary storage device such as an HDD. Alternatively, a non-volatile storage device such as a flash disk typified by an SSD may be used instead of the HDD.

In the information processing apparatus according to the present exemplary embodiment, it is assumed that a single CPU **1611** uses a single memory (the RAM **1613**) to perform processes illustrated in flowcharts described below. Alternatively, another form may be employed. For example, a plurality of CPUs, RAMs, ROMs, and storages can cooperate to perform the processes illustrated in the flowcharts described below.

An operation unit I/F **1615** connects input and output devices and the control unit **1610**. A keyboard **1616** is used to input an instruction from the user, and to input a character and a number. A mouse may be prepared in addition to the keyboard **1616**.

A display **1617** is an output device for displaying information to the user. The user inputs an instruction by pressing a key displayed on the display **1617**, using an input device such as the keyboard **1616** or the mouse.

Further, the control unit **1610** is connected to a LAN **100** via a communication unit I/F **1622**. The communication unit I/F **1622** transmits data to an external apparatus via a network such as the LAN **100** or a wireless LAN (not illustrated), and receives data from an external apparatus on the LAN **100**. Further, the communication unit I/F **1622** communicates with an external apparatus via a local interface such as a USB interface.

The control unit **1610** transmits print data to the image processing apparatus and receives image data from the image processing apparatus via the communication unit I/F **1622**. In the present exemplary embodiment, as an example of the information processing apparatus, an information processing apparatus including a keyboard and a display is used. Alternatively, for example, a portable information terminal such as a smartphone or a tablet terminal may be used. It is possible to appropriately modify the method for providing a control method for transmitting print data to the image processing apparatus. The control method may be provided as an application for printing. Alternatively, the method is also applicable to a control method for transmitting print data to the image processing apparatus via a cloud server. Yet alternatively, the method is also applicable to a control method for transmitting print data to the image

processing apparatus using a communication method such as Bluetooth (registered trademark) or near field communication (NFC).

FIGS. **17** and **20** are flowcharts illustrating the control method for transmitting print data to the image processing apparatus. In this control method, each operation (step) illustrated in the flowcharts in FIGS. **17** and **20** is achieved by the CPU **1611** executing a driver program based on the flowcharts. If the user issues an instruction for printing data, the CPU **1611** executes the driver program. First, in step **S1701**, the CPU **1611** displays on the display **1617** an operation screen for setting printing.

FIG. **18**A is a diagram illustrating an example of the setting screen displayed in step **S1701**. Via the screen in FIG. **18**A, the user can set the document size, the sheet size on which printing is performed, the number of copies, the orientation of printing, and the page layout (page aggregate). A tab key **1801** is a key used to display items for making page settings. A tab key **1802** is a key used to display items regarding a finishing process. A key **1803** is a key used by the user to transmit print data to the image processing apparatus. A key **1804** is a key used to cancel the transmission of print data.

If the tab key **1802** is pressed on the screen in FIG. **18**A, the CPU **1611** causes the screen to transition to a screen corresponding to a finishing tab illustrated in FIG. **18**B. FIG. **18**B is a diagram illustrating an example of an operation screen. On the screen in FIG. **18**B, the user can select one-sided printing or two-sided printing, select the type of the binding process, specify the binding position, and set the printing of the mark. The printing of the mark can be set only if the user selects the stapleless binding process as the binding process.

To return from the screen in FIG. **18**B to the page setting screen, the user presses the tab key **1801**. An area **1805** is an area for selecting the type of the binding process. If the area **1805** is pressed, "stapleless binding process" and "staple binding process" are displayed as options in a drop-down list. In the present exemplary embodiment, the binding process is selected between two types including the staple binding process and the stapleless binding process. The binding process options, however, are not limited to these binding processes. It is only required that a binding process according to a binding unit included in the image processing apparatus to which print data is transmitted can be selected.

If the user selects an item **1806** from the drop-down list, the CPU **1611** controls the screen to display check boxes for making settings regarding the printing of the mark.

FIG. **19**A is a diagram illustrating an example of an operation screen displayed when the stapleless binding process is selected as the binding process. Check boxes **1902** and **1903** in FIG. **19**A are examples of setting items regarding the stapleless binding process.

Via the screen in FIG. **19**A, the user can set the printing of the mark. The box **1902** is a check box used to change the setting of whether the mark is to be printed. The box **1903** is a check box used to change the setting of whether the mark is to be printed on the back surface of the last sheet even in a case where there is no image to be printed on the back surface of the last sheet. The user can press the box **1902** or **1903** to reverse the state of the check box. The setting is enabled in a state where the box is checked, and the setting is disabled in a state where the box is not checked. The check box **1903** is displayed in a selectable manner only if the setting of the printing of the mark is set to enabled. If the setting of the printing of the mark is not set to enabled, the check box **1903** is displayed in a grayed-out manner.

A key **1807** is a key used to set the binding position. If the user presses the key **1807**, the CPU **1611** newly displays a screen in FIG. **19**B as a sub screen of the screen in FIG. **19**A. The CPU **1611** performs control so that an operation on the screen in FIG. **19**A is not received unless the user responds to the screen in FIG. **19**B.

FIG. **19**B is an example of the operation screen displayed when the key **1807** is pressed. In FIG. **19**B, the user can select from among radio buttons **1912** the position where the binding process is to be performed. The radio buttons **1912** are radio buttons for selecting one setting from among a plurality of buttons (options). Further, information **1911** is information for notifying the user of the position where the binding process is to be performed. A key **1913** is a key used to apply the setting regarding the binding process set via the screen in FIG. **19**B and close the setting screen. A key **1914** is a key used to discard the setting regarding the binding process set via the screen in FIG. **19**B and close the setting screen. If the key **1913** or **1914** is pressed, the CPU **111** closes the screen in FIG. **19**B as the sub screen, and resumes the reception of an operation on the screen in FIG. **19**A as a main screen. The user can make further settings of printing via the screens in FIGS. **18**A, **18**B, **19**A, and **19**B.

Referring back to FIG. **17**, in step **S1702**, via the screens in FIGS. **18**A, **18**B, **19**A, and **19**B, the CPU **1611** receives settings regarding print data including the settings of the binding position and the binding process. In step **S1703**, the CPU **1611** determines whether the key **1803** is pressed via the screen in FIG. **18**A, **18**B, or **19**A. If the CPU **1611** determines that the "OK" key **1803** is pressed (YES in step **S1703**), the processing proceeds to step **S1704**. If the CPU **1611** determines that the "OK" key **1803** is not pressed (NO in step **S1703**), the processing proceeds to step **S1705**. In step **S1704**, the CPU **1611** generates print data according to the setting values held in the storage **1614**. The process of step **S1704** will be described with reference to a flowchart in FIG. **20**.

On the other hand, in step **S1705**, the CPU **1611** determines whether the key **1804** is pressed via the screen in FIG. **18**A, **18**B, or **19**A. If the CPU **1611** determines that the "cancel" key **1804** is pressed (YES in step **S1705**), the processing proceeds to step **S1706**. If the CPU **1611** determines that the "cancel" key **1804** is not pressed (NO in step **S1705**), the processing returns to step **S1702**, in which the CPU **1611** receives print settings from the user. In step **S1706**, the CPU **1611** stops the transmission of print data, and also closes the print setting screen.

Next, the transmission of print data will be described with reference to FIG. **20**. In the present exemplary embodiment, control for generating print data including image data combined with the mark and transmitting the generated print data is performed.

In step **S2001**, the CPU **1611** determines whether, in the setting values held in the storage **1614**, a setting is made so that the mark is to be printed. If a setting is made so that the mark is to be printed (YES in step **S2001**), the processing proceeds to step **S2002**. If a setting is not made so that the mark is to be printed (NO in step **S2001**), the processing proceeds to step **S2011**.

In step **S2011**, the CPU **1611** generates output data for a single page from the data that the user has issued the instruction to print. Then, the CPU **1611** temporarily stores the output data onto the storage **1614** or the RAM **1613**. In step **S2012**, the CPU **1611** determines whether there is a next page. If it is determined that there is a next page (YES in step **S2012**), the processing returns to step **S2011**, in which the CPU **1611** reads the next page. If, on the other hand, it is

determined that there is no next page (NO in step S2012), the processing proceeds to step S2010.

If, on the other hand, it is determined in step S2001 that the mark is to be printed (YES in step S2001), the processing proceeds to step S2002. In step S2002, the CPU 1611 generates output data for a single page from the data that the user has issued the instruction to print. Then, the CPU 1611 temporarily stores the output data onto the storage 1614 or the RAM 1613.

In step S2003, the CPU 1611 determines whether the output data generated in step S2002 is output data corresponding to the first page. If the generated output data corresponds to image data of the first page (YES in step S2003), the processing proceeds to step S2004. If the generated output data does not correspond to image data of the first page (NO in step S2003), the processing proceeds to step S2005.

In step S2004, according to the setting value of the binding position held in the storage 1614, the CPU 1611 determines the position where the mark image is to be added and the orientation of the mark. Then, the CPU 1611 combines the mark image with the output data corresponding to the first page.

On the other hand, in step S2005, the CPU 1611 determines whether there is a next page. If it is determined that there is a next page (YES in step S2005), the processing returns to step S2002, in which the CPU 1611 generates image data of the next page. If, on the other hand, it is determined that there is no next page (NO in step S2005), the processing proceeds to step S2006. In step S2006, the CPU 1611 determines whether the output data corresponding to the last page is to be printed on the back surface of a sheet. Specifically, if two-sided printing is set in the print settings made via the screens in FIGS. 18A, 18B, 19A, and 19B, and the number of pages is an even number, the CPU 1611 determines that the output data corresponding to the last page is to be printed on the back surface of a sheet (YES in step S2006), and the processing proceeds to step S2009. If, on the other hand, one-sided printing is set, or if two-sided printing is set and the number of pages is an odd number, the CPU 1611 determines that the output data corresponding to the last page is not to be printed on the back surface of a sheet (NO in step S2006), and the processing proceeds to step S2007.

In step S2007, the CPU 1611 determines whether a setting is made so that the mark is to be printed in a case where there is no image to be printed on the back surface of the last sheet. If a setting is made so that the mark is to be printed in a case where there is no image to be printed on the back surface of the last sheet (YES in step S2007), the processing proceeds to step S2008. If, on the other hand, a setting is not made so that the mark is to be printed in a case where there is no image to be printed on the back surface of the last sheet (NO in step S2007), the processing proceeds to step S2010. In step S2010, the CPU 1611 performs a print process.

In step S2008, the CPU 1611 generates blank output data to be printed on the back surface of the last sheet. In step S2009, according to the setting value of the binding position held in the storage 1614, the CPU 1611 determines the position where the mark image is to be added and the orientation of the mark. Then, the CPU 1611 combines the mark image with the output data corresponding to the last page. For example, as a setting of the binding process, if a setting is made so that an oblique binding process is to be performed at the upper left end as illustrated in FIG. 7A, the CPU 1611 combines the mark rotated by 90 degrees with the output data at the position 811*b* illustrated in FIG. 8B.

In step S2010, the CPU 1611 generates print data based on the setting values and the output data held in the storage 1614. Further, the CPU 1611 controls the communication unit I/F 1622 to transmit the print data to the image processing apparatus, and transmits the print data. Then, the transmission process ends. For example, the output data, information about the number of copies to be printed, information about the number of pages of the print data, information about two-sided printing, and information about the binding process are added to the print data generated by the CPU 1611 in step S2010.

The image processing apparatus performs a print process based on the received print data as described in the first exemplary embodiment. The CPU 111 of the image processing apparatus conveys a sheet from a sheet feeding unit specified in the print data, prints an image based on the print data on the conveyed sheet, and performs a binding process specified in the print data.

In the present exemplary embodiment, also in a case in which an information processing apparatus transmits print data to an image processing apparatus and the image processing apparatus performs a binding process based on the print data, it is possible to add to sheets a mark that allows the identification of the binding position when the sheets are bound without using a staple.

In the present exemplary embodiment, the description has been given of an example case where, when generating output data of print data, the driver program combines the mark with the output data in advance. The present invention, however, is not limited to this. Alternatively, for example, the driver program may add setting information about the mark to print data, and the image processing apparatus may add the mark.

Further, in the present exemplary embodiment, the description has been given of an example case where the mark is printed on the front surface page of the first sheet and the back surface of the last sheet. The present invention, however, is not limited to this. Alternatively, for example, the mark image may be combined with output data of all the pages for which the binding process is set.

While the desirable exemplary embodiments of the present invention have been described above in detail, the present invention is not limited to such particular exemplary embodiments, but can be modified and changed in various manners within the scope of the present invention described in the appended claims.

According to an exemplary embodiment of the present invention, if a binding process without using a staple is performed, the position where the binding process is performed is made easily identifiable. This can prevent sheets from being torn or coming off.

Embodiments of the present invention can also be realized by a computer of a system or apparatus that reads out and executes computer executable instructions recorded on a storage medium (e.g., non-transitory computer-readable storage medium) to perform the functions of one or more of the above-described embodiment(s) of the present invention, and by a method performed by the computer of the system or apparatus by, for example, reading out and executing the computer executable instructions from the storage medium to perform the functions of one or more of the above-described embodiment(s). The computer may comprise one or more of a central processing unit (CPU), micro processing unit (MPU), or other circuitry, and may include a network of separate computers or separate computer processors. The computer executable instructions may be provided to the computer, for example, from a network or the storage

medium. The storage medium may include, for example, one or more of a hard disk, a random-access memory (RAM), a read only memory (ROM), a storage of distributed computing systems, an optical disk (such as a compact disc (CD), digital versatile disc (DVD), or Blu-ray Disc (BD)™), a flash memory device, a memory card, and the like.

While the present invention has been described with reference to exemplary embodiments, it is to be understood that the invention is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

This application claims the benefit of Japanese Patent Application No. 2014-178562, filed Sep. 2, 2014, which is hereby incorporated by reference herein in its entirety.

What is claimed is:

1. An image processing apparatus comprising:

a printing unit configured to print an image on a sheet;

a stapleless binding unit configured to perform a stapleless binding process for binding, without using a staple, a plurality of sheets on which images are printed by the printing unit;

a combining unit configured to combine, with a print target image, a mark image to be printed on at least one of the plurality of sheets indicating a position proximate thereto, yet separate therefrom, where the stapleless binding process is to be performed, the mark image identifiably showing that the plurality of sheets has been bound; and

a control unit configured to, in a case where the stapleless binding unit performs the stapleless binding process, perform control so that an image with which the mark image is combined by the combining unit is printed on a sheet.

2. The image processing apparatus according to claim **1**, wherein the combining unit combines the mark image with an image corresponding to a front surface of a first sheet of the plurality of sheets to be subjected to the stapleless binding process.

3. The image processing apparatus according to dam **2**, wherein the combining unit further combines the mark image with an image corresponding to a back surface of a last sheet of the plurality of sheets to be subjected to the stapleless binding process.

4. The image processing apparatus according to claim **1**, further comprising a binding setting unit configured to set a binding position where the stapleless binding unit performs the stapleless binding process, wherein based on the binding position set by the binding setting unit, the combining unit determines a position where the mark image is combined.

5. The image processing apparatus according to claim **1**, wherein the combining unit combines the mark image within an area where the printing unit can perform printing.

6. The image processing apparatus according to claim **1**, further comprising a first setting unit configured to set whether a mark is to be printed, wherein even in a case where the stapleless binding unit performs the stapleless binding process, the combining unit does not combine the mark image if the first setting unit makes a setting so that the mark is not to be printed.

7. The image processing apparatus according to claim **1**, further comprising a second setting unit configured to, in a case where there is no print target image corresponding to a back surface of a last sheet of the plurality of sheets to be subjected to the stapleless binding process, set whether a mark is to be printed on the back surface of the last sheet.

8. The image processing apparatus according to claim **1**, wherein the combining unit combines, with the print target image, a mark image indicating a direction in which a sheet is to be turned over.

9. An image processing apparatus comprising:

a printing unit configured to print an image on a sheet;

a stapleless binding unit configured to perform a stapleless binding process for binding, without using a staple, a plurality of sheets on which images are printed by the printing unit;

an imprinting unit configured to imprint, on at least one of the plurality of sheets, a stamp indicating a position proximate thereto, yet separate therefrom, where the stapleless binding process is to be performed or has been performed, the stamp identifiably showing that the plurality of sheets has been bound; and

a control unit configured to, in a case where the stapleless binding unit performs the stapleless binding process, control the imprinting unit to imprint the stamp.

10. A method for controlling an image processing apparatus including a printing unit configured to print an image on a sheet, and a stapleless binding unit configured to perform a stapleless binding process for binding, without using a staple, a plurality of sheets on which images are printed by the printing unit, the method comprising:

combining, with a print target image, a mark image to be printed on at least one of the plurality of sheets indicating a position proximate thereto, yet separate therefrom, where the stapleless binding process is to be performed, the mark image identifiably showng that the plurality of sheets has been bound; and

in a case where the stapleless binding unit performs the stapleless binding process, performing control so that an image with which the mark image is combined in the combining is printed on a sheet.

11. A method for controlling an image processing apparatus including a printing unit configured to print an image on a sheet, a stapleless binding unit configured to perform a stapleless binding process for binding, without using a staple, a plurality of sheets on which images are printed by the printing unit, and an imprinting unit configured to imprint, on at least one of the plurality of sheets, a stamp indicating a position proximate thereto, yet separate therefrom, where the stapleless binding process is to be performed or has been performed, the method comprising:

in a case where the stapleless binding unit performs the stapleless binding process, controlling the imprinting unit to imprint the stamp.

12. An information processing apparatus for transmitting a print target image to an image processing apparatus including a printing unit configured to print an image on a sheet, and a stapleless binding unit configured to perform a stapleless binding process for binding, without using a staple, a plurality of sheets on which images are printed by the printing unit, the information processing apparatus comprising:

a setting unit configured to set whether the stapleless binding process is to be performed;

a combining unit configured to combine, with the print target image, a mark image to be printed on at least one of the plurality of sheets indicating a position proximate thereto, yet separate therefrom, where the stapleless binding process is to be performed, the mark image identifiably showing that the plurality of sheets has been bound; and

a transmission unit configured to, in a case where the setting unit makes a setting so that the stapleless

binding process is to be performed, transmit to the image processing apparatus an image with which the mark image is combined by the combining unit.

13. A method for controlling an information processing apparatus for transmitting a print target image to an image processing apparatus including a printing unit configured to print an image on a sheet, and a stapleless binding unit configured to perform a stapleless binding process for binding, without using a staple, a plurality of sheets on which images are printed by the printing unit, the method comprising:

setting whether the stapleless binding process is to be performed;

combining, with the print target image, a mark image to be printed on at least one of the plurality of sheets indicating a position proximate thereto, yet separate therefrom, where the stapleless binding process is to be performed, the mark image identifiably showing that the plurality of sheets has been bound; and

in a case where a setting is made in the setting so that the stapleless binding process is to be performed, transmitting to the image processing apparatus an image with which the mark image is combined in the combining.

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